Central Radio Propagation Laboratory

IONOSPHERIC PREDICTIONS

for May 1965

IMPORTANT NOTICE

SEE INTRODUCTION PAGE

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U.S. DEPARTMENT of COMMERCE
National Bureau of Standards
Number 26/Issued February 1965

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

NATIONAL BUREAU OF STANDARDS
A. V. Astin, Director

Central Radio Propagation Laboratory

Ionospheric Predictions

for May 1965

Number 26

Issued

February 1965

[Formerly "Basic Radio Propagation Predictions," CRPL Series D.]

The CRPL Ionospheric Predictions are issued monthly as an aid in determining the best sky-wave frequencies over any transmission path, at any time of day, for average conditions for the month. Issued three months in advance, each issue provides tables of numerical coefficients that define the functions describing the predicted worldwide distribution of foF2 and M(3000)F2 and maps for each even hour of universal time of MUF(Zero)F2 and MUF(4000)F2.

NOTE: Department of Defense personnel see back cover.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget (June 19, 1961).

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price 25 cents.
Annual subscription (12 issues) $2.50 (75 cents additional for foreign mailing).

National Bureau of Standards

The functions of the National Bureau of Standards are set forth in an Act of Congress, March 3, 1901, as amended. These include the development and maintenance of the national standards of measurement and the provision of means and methods for making measurements consistent with these standards; the determination of physical constants and properties of materials; the development of methods and instruments for testing materials, devices, and structures; advisory services to government agencies on scientific and technical problems; invention and development of devices to serve special needs of the Government; and the development of standard practices, codes, and specifications. The work includes basic and applied research, development, engineering, instrumentation, testing, evaluation, calibration services, and various consultation and information services. The Bureau also serves as the Federal technical research center in a number of specialized fields.

Central Radio Propagation Laboratory

The Central Radio Propagation Laboratory at Boulder, Colorado, is the central agency of the Federal Government for the collection, analysis, and dissemination of information on propagation of radio waves at all frequencies along the surface of the earth, in the atmosphere, and in space, and performs scientific studies looking toward new techniques for the efficient use and conservation of the radio spectrum. To carry out this responsibility, the CRPL—

1. Acts as the central agency for the conduct of basic research on the nature of radio waves, the pertinent properties of the media through which radio waves are transmitted, the interaction of radio waves with those media, and on the nature of radio noise and interference effects. This includes compilation of reports by other foreign and domestic agencies conducting research in this field and furnishing advice to government and nongovernment groups conducting propagation research.

2. Performs studies of specific radio propagation mechanisms and performs scientific studies looking toward the development of techniques for efficient use and conservation of the radiofrequency spectrum as part of its regular program or as requested by other government agencies. In an advisory capacity, coordinates studies in this area undertaken by other government agencies.

3. Furnishes advisory and consultative service on radio wave propagation, on radiofrequency utilization, and on radio systems problems to other organizations within the United States, public and private.

4. Prepares and issues predictions of radio wave propagation and noise conditions and warnings of disturbances in these conditions.

5. Acts as a central repository for data, reports, and information in the field of radio wave propagation.

6. Performs scientific liaison and exchanges data and information with other countries to advance knowledge of radio wave propagation and interference phenomena and spectrum conservation techniques, including that liaison required by international responsibilities and agreements.

NOTICE

Beginning with the December issue, No. 24 of this series, polar plots of the prediction maps will be included for every even hour universal time. These are plotted on the same scale as the former polar plots, but extend only to 40° latitude. The contours of the rectangular world maps are now cut off at 80° latitude. Occasional slight discrepancies between the contours of the rectangular maps and those of the polar maps are due to the different computer programs used to derive the two sets of contours from the table of numerical coefficients. These discrepancies are well within the accuracy of the predictions.

These polar maps are being published on a trial basis for six months. They will be discontinued after six months unless there is a positive indication of their usefulness from a substantial proportion of users of these predictions. Therefore, if you wish these to continue, it is necessary to send us your comments in writing as soon as possible.

Introduction

The "Central Radio Propagation Laboratory Ionospheric Predictions" is the successor to the former "Basic Radio Propagation Predictions," CRPL Series D. To make effective use of these predictions, National Bureau of Standards Handbook 90, "Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping," should be obtained from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, price 40 cents. This Handbook includes required additional data, nomographs and graphical aids, as well as methods for use of the predictions. The Handbook supersedes the obsolete NBS Circular 465.

The basic prediction appears in tables 1 and 2, presenting predicted coefficients for foF2 and M(3000)F2 defining the numerical map functions describing the predicted worldwide variation of these characteristics. With additional auxiliary information, these coefficients may be used as input data for electronic computer programs solving specific high-frequency propagation problems. Basic equations, their interpretation, and methods of using numerical maps are described in papers by W. B. Jones and R. M. Gallet, "The Representation of Diurnal and Geographic Variations of Ionospheric Data by Numerical Methods," Vol. 66D, No. 4, July–Aug. 1962, pages 419–438, and "Methods for Applying Numerical Maps of Ionospheric Characteristics," Vol. 66D, No. 6, Nov.–Dec. 1962, pages 649–662, both in the Journal of Research of the National Bureau of Standards, Section D. Radio Propagation. The predicted numerical map coefficients of tables 1 and 2 may be purchased in the form of a tested set of punched cards. Write to Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colo., to arrange for purchase of a set of punched cards, and for information and assistance in the application of computer methods and numerical prediction maps to specific propagation problems.

The graphical prediction maps, derived from the basic prediction, are provided for those unable to make use of an electronic computer. Figures 1 to 12 present world maps of MUF (Zero) F2 and MUF(4000)F2 for each even hour of universal time. Figures 13 to 24 present the same predictions for even hours 00 through 22 universal time for the North and South Polar areas. Handbook 90 describes methods for including regular E–F1 propagation. Figure A is a graph of predicted and observed Zürich sunspot numbers which shows the recent trend of solar activity. Table A lists observed and predicted Zürich smoothed relative sunspot numbers and includes the sunspot number used for the current prediction.

Members of U.S. Army, Navy, or Air Force desiring the Handbook and the Ionospheric Predictions should send requests to the proper service address; for Navy: The Director, Naval Communications, Department of the Navy, Washington, D.C., 20350; for Air Force: Directorate of Command Control and Communications, Headquarters, United States Air Force, Washington, D.C., 20330. Attention: AFOCCAA. Army personnel should refer to the Handbook as TM 11–499 and to monthly predictions as TB 11–499–( ), predictions for the month of May 1965 being distributed in February 1965 and designated TB 11–499–(26), and should requisition these through normal publication channels.

Information concerning the theory of radio wave propagation and such important problems as absorption, field intensity, lowest useful high frequencies, etc., is given in National Bureau of Standards Circular 462, "Ionospheric Radio Propagation." A revised work is in preparation which will be announced in the Ionospheric Prediction series when available. Additional information about radio noise may be found in C.C.I.R. Report Number 322, "Revision of Atmospheric Noise Data," International Telecommunication Union, Geneva, 1964.

Reports to this Laboratory of experience with these predictions would be appreciated. Correspondence should be addressed to the Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado.

NOTE: The MUF(ZERO)F2 values of figures 1A through 12A were derived by adding one-half the gyrofrequency to the foF2 calculated by use of the predicted coefficients in table 1. The error introduced by this approximation is generally not important compared to other uncertainties in the predictions, and is significant only when the foF2 is near or below the gyrofrequency. If more precise values of predicted fxF2 are desired, the theoretical relationships should be applied to the foF2 values calculated by the coefficients in table 1.

Table A

Observed and Predicted Zurich Smoothed Relative Sunspot Numbers

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1954	6 (14)	6 (12)	4 (11)	3 (10)	4 (10)	4 (9)	5 (8)	7 (8)	8 (8)	8 (10)	10 (10)	12 (11)
1955	14 (12)	16 (14)	20 (14)	23 (13)	29 (16)	35 (18)	40 (22)	46 (27)	55 (30)	64 (31)	73 (35)	81 (42)
1956	89 (48)	98 (53)	109 (60)	119 (68)	127 (77)	137 (89)	146 (95)	150 (105)	151 (119)	156 (135)	160 (147)	164 (150)
1957	170 (150)	172 (150)	174 (150)	181 (150)	186 (150)	188 (150)	191 (150)	194 (150)	197 (150)	200 (150)	201 (150)	200 (150)
1958	199 (150)	201 (150)	201 (150)	197 (150)	191 (150)	187 (150)	185 (150)	185 (150)	184 (150)	182 (150)	181 (150)	180 (150)
1959	179 (150)	177 (150)	174 (150)	169 (150)	165 (146)	161 (143)	156 (141)	151 (142)	146 (141)	141 (139)	137 (137)	132 (137)
1960	129 (136)	125 (135)	122 (133)	120 (130)	117 (125)	114 (120)	109 (118)	102 (115)	98 (110)	93 (108)	88 (105)	84 (100)
1961	80 (100)	75 (90)	69 (90)	64 (90)	60 (85)	56 (85)	53 (80)	52 (75)	52 (70)	51 (70)	50 (65)	49 (60)
1962	45 (60)	42 (50)	40 (48)	39 (45)	39 (42)	38 (37)	37 (34)	35 (31)	33 (29)	31 (28)	30 (27)	30 (34)
1963	29 (31)	30 (28)	30 (26)	29 (25)	29 (25)	28 (25)	28 (23)	27 (21)	27 (20)	26 (18)	23 (18)	21 (17)
1964	19 (17)	17 (17)	15 (17)	12 (17)	10 (17)	(17)	(17)	(17)	(17.5)	(17.3)	(17.0)	(17.0)
1965	(15.0)	(16.0)	(16.0)	(16.0)	(15.0)*							
1966												

Note: Final numbers are listed through June 1963, the succeeding values being based on provisional data. The predicted numbers are in parentheses.

* Number used for predictions in this issue.

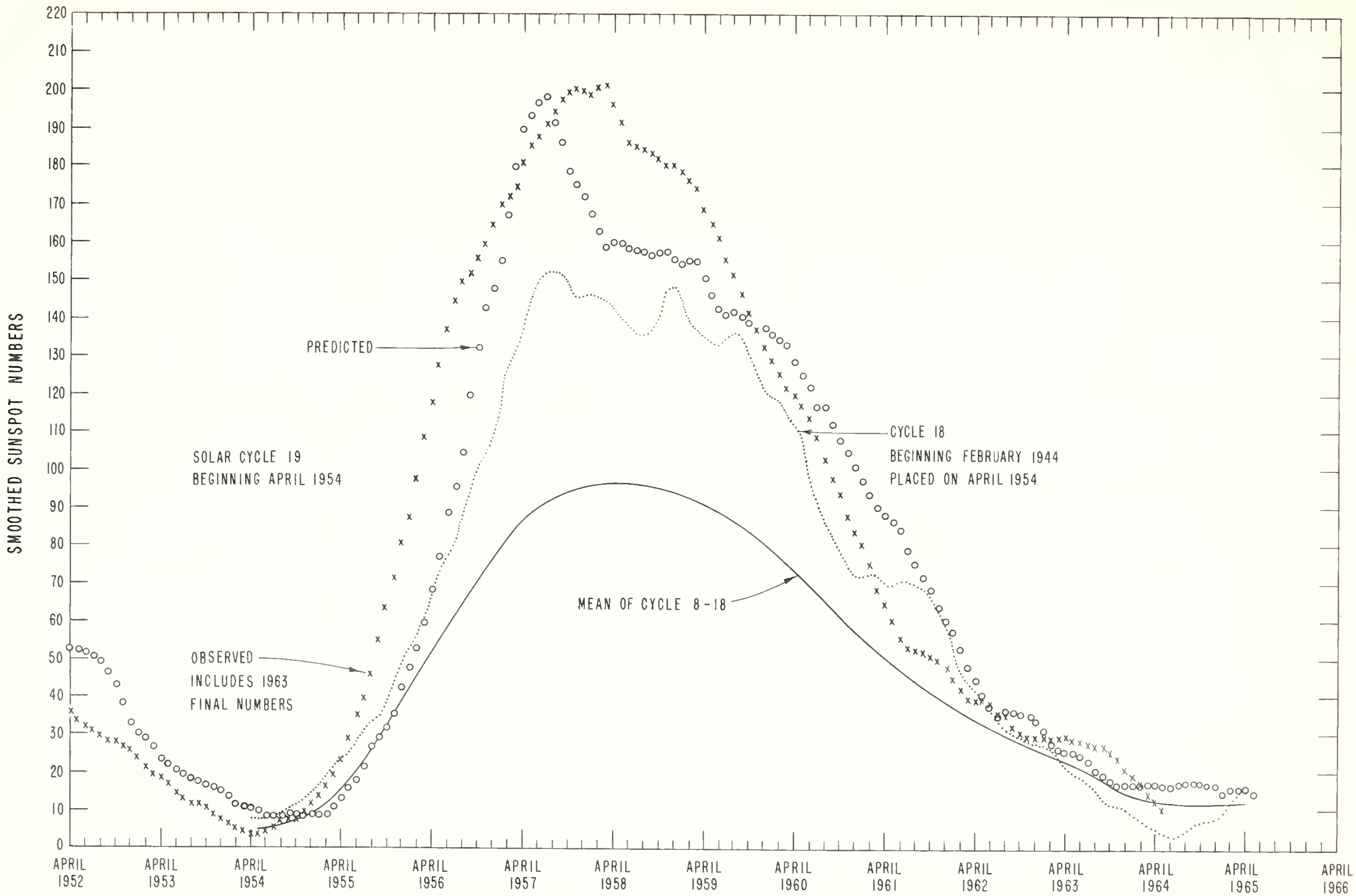

FIG. A. PREDICTED AND OBSERVED SUNSPOT NUMBERS

TABLE I

TIME VARIATION

	Harmonic	0	1		2		3		4	
	K \ S	0	1	2	3	4	5	6	7	8
I	0	6.6736174E 00	1.8683198E 00	2.1325152E 00	-4.6419259E-01	1.6694029E-01	-3.7651016E-01	-5.1460949E-01	3.0174816E-01	-9.8621802E-02
	1	2.1272126E 00	1.8923014E 00	-2.8303474E 00	2.8437828E-01	-8.9549646E-01	2.1578802E-01	-5.2214186E-02	-1.1602631E-01	1.9213089E-01
	2	-1.0961973E 01	1.6017149E 00	9.8391397E 00	8.1137818E 00	-2.6311821E 00	8.3258015E-02	8.9247456E-01	-2.0072933E 00	2.8545337E 00
	3	6.9380321E-01	6.6105894E 00	4.0857549E 01	1.1424020E 01	-2.8445002E 00	6.6499371E-01	2.3289658E 00	5.3108292E 00	7.1188083E 00
	4	5.9190533E 01	-4.6207442E 01	-1.0221036E 02	-3.2349901E 01	2.8267320E 01	1.3743777E 01	-4.1341778E 00	4.7505490E 00	-2.5616509E 01
	5	-2.3462847E 01	-7.2513630E 01	-2.0641363E 02	-9.3565403E 01	2.8379824E 01	-1.4688071E 01	-1.0842432E 01	-2.2974972E 01	-4.3002956E 01
	6	-2.3096629E 02	1.5321340E 02	3.3370227E 02	4.0574356E 01	-1.1541298E 02	-6.4609576E 01	3.0158771E 01	1.1537199E 01	8.6120393E 01
	7	5.0943704E 01	1.7826592E 02	4.3090004E 02	2.2528234E 02	-7.3565500E 01	5.0367261E 01	2.4996231E 01	4.0141591E 01	9.2778003E 01
	8	4.2774463E 02	-2.2014748E 02	-5.1447799E 02	-4.1414235E 00	2.1820725E 02	1.2585901E 02	-7.4376147E 01	-5.8707486E 01	-1.3873342E 02
	9	-4.1646609E 01	-1.7735758E 02	-3.9864111E 02	-2.2123047E 02	7.8235446E 01	-6.2353209E 01	-2.7382173E 01	-3.2342202E 01	-6.7040802E 01
	10	-3.6453271E 02	1.4826449E 02	3.8146776E 02	-2.0118708E 01	-1.9227891E 02	-1.1182657E 02	7.4484882E 01	7.3900869E 01	1.0868199E 02
	11	1.1868596E 01	6.3061724E 01	1.3597104E 02	7.7772930E 01	-2.9395382E 01	2.5825635E 01	1.0968915E 01	9.9979991E 00	3.0022036E 01
	12	1.1638137E 02	-3.8440607E 01	-1.1018867E 02	8.4744067E 00	6.3762494E 01	3.7153167E 01	-2.6523519E 01	-2.9730129E 01	-3.3261217E 01
II	13	-1.1585846E-01	6.3142148E-02	3.2232790E-01	1.3876167E-01	5.8753731E-02	-2.7134342E-03	3.6459205E-02	3.3972064E-02	5.6412047E-02
	14	2.9064959E-02	-3.0570817E-02	5.2354494E-01	-1.5155590E-01	3.4810951E-02	-8.4553123E-02	-2.7472990E-02	1.3587136E-01	-1.8868443E-02
	15	1.8229176E 00	1.2722950E 00	1.3349820E 00	-1.1350045E 00	4.5696721E-02	-1.1299451E-01	-6.2807781E-03	4.8468248E-02	2.6124578E-02
	16	-1.5840108E 00	-1.4955340E 00	-5.2535819E 00	-5.7253382E 00	-2.9517763E 00	-1.1060553E 00	-3.7987977E-01	8.3824118E-01	-8.2916532E-01
	17	1.7770401E 00	-6.1645971E 00	-8.1643384E 00	-2.6389934E 00	-2.1747576E 00	1.1359484E 00	3.4728095E-02	-1.0178238E 00	-1.3803413E 00
	18	-1.0568674E 01	-1.3778948E 01	-9.0759237E 00	-2.9640402E 00	-3.3029329E-01	1.7417984E 00	6.5521168E-02	-1.6987543E 00	5.0255845E-01
	19	-2.4624068E 01	-1.9022437E 01	-2.6867911E 01	1.3561552E 01	-5.7028142E 00	7.5733309E-01	-2.9615534E-03	-7.0951838E-01	-1.0238044E 00
	20	6.1656238E 01	5.2470428E 01	9.3860562E 01	8.0713186E 01	4.2348642E 01	1.0639264E 01	8.4687387E-01	-9.0967466E 00	1.0587879E 01
	21	-1.9243902E 01	9.1569042E 01	6.8428493E 01	1.8552471E 01	2.6275532E 01	-9.4506431E 00	-1.0675908E 00	4.2153199E 00	1.0525122E 01
	22	7.8927720E 01	1.4974490E 02	5.7384599E 01	5.6412554E 01	4.8404175E-01	-3.1958425E 00	3.5376772E-01	4.9286684E 00	-3.9718121E 00
	23	1.2447538E 02	7.9335862E 01	1.3899733E 02	-6.0683500E 01	4.0757941E 01	1.0991983E-01	6.1590536E-01	4.6382543E 00	4.8243911E 00
	24	-3.2807672E 02	-2.8291369E 02	-4.4074664E 02	-3.8657998E 02	-1.9927719E 02	-4.4930410E 01	-2.1272749E 00	3.9791363E 01	-4.5395041E 01
	25	6.7330121E 01	-4.4777300E 02	-2.5084805E 02	-6.4182991E 01	-1.2034723E 02	3.0949699E 01	3.6358095E 00	-2.9052297E 00	-3.2130009E 01
	26	-2.0333045E 02	-6.0536299E 02	-1.9448785E 02	-2.4057949E 02	1.2873852E 00	-6.0727917E 00	-7.2743580E-01	4.5037597E-02	1.8011313E 01
	27	-2.7018384E 02	-1.2899597E 02	-3.0750561E 02	1.1855633E 02	-1.0698614E 02	-1.0718283E 01	-1.5765497E 00	-1.2691073E 01	-8.2248348E 00
	28	7.1837397E 02	5.7107808E 02	8.5986919E 02	8.1872224E 02	4.2006638E 02	9.3767970E 01	5.2101104E 00	-8.1510818E 01	8.3830587E 01
	29	-8.0968052E 01	9.5914317E 02	4.6533469E 02	1.0905020E 02	2.5036938E 02	-4.8384015E 01	-6.0007444E 00	-6.4520051E 00	4.5738696E 01
	30	2.2877667E 02	1.1367026E 03	3.5742901E 02	4.3445960E 02	4.2867157E 00	1.6969950E 01	2.8167671E-01	-2.2416315E 01	-4.3040943E 01
	31	2.5285543E 02	8.3578762E 01	3.1026146E 02	-9.9240726E 01	1.1937281E 02	2.1584434E 01	1.6610318E 00	1.5120144E 01	6.8644032E 00
	32	-7.0281015E 02	-5.4363693E 02	-7.4968886E 02	-7.9397674E 02	-4.0490061E 02	-9.2675498E 01	-5.6720150E 00	7.6446947E 01	-6.9771569E 01
	33	2.3728415E 01	-9.3403593E 02	-4.2733660E 02	-9.3474994E 01	-2.3879397E 02	3.4284652E 01	4.7639124E 00	8.6730889E 00	-3.0263371E 01
	34	-1.0596206E 02	-9.9808025E 02	-3.3744973E 02	-3.6150709E 02	-1.6016875E 01	-6.1202229E 00	5.3158049E-01	3.5815450E 01	4.7641829E 01
	35	-8.3170893E 01	-1.4364462E 01	-1.1763983E 02	2.7248907E 01	-4.8275054E 01	-1.2214902E 01	-6.1695850E-01	-6.4741871E 00	-2.6620813E 00
	36	2.5260675E 02	1.8480617E 02	2.4142269E 02	2.8825688E 02	1.4488660E 02	3.4468158E 01	2.2479372E 00	-2.6456408E 01	2.1480148E 01
	37	7.6100047E 00	3.3700838E 02	1.5514791E 02	3.3754004E 01	8.5331012E 01	-8.0941328E 00	-1.4645647E 00	-2.5395451E 00	7.4290325E 00
	38	1.2724775E 01	3.3168594E 02	1.2778622E 02	1.1414730E 02	1.0522192E 01	-3.7109078E 00	-3.9901080E-01	-1.6984774E 01	-1.9204422E 01
III	39	-9.8891425E-05	-6.3764611E-02	1.2622212E-02	-8.7709109E-02	-3.3842156E-02	-4.0062672E-02	-2.8510768E-04	4.9101009E-02	-2.3945745E-03
	40	2.8494426E-03	7.5345452E-02	-1.5719320E-02	7.8562148E-02	-4.5162825E-02	-3.6469934E-02	-1.9856961E-04	2.1248852E-02	-4.0824728E-03
	41	9.3572106E-03	4.2260094E-01	-8.9805360E-02	-2.4735326E-01	-1.2121855E-02	-1.2959160E-01	-4.0892990E-04	-2.7554072E-02	4.6551023E-02
	42	1.5107583E-04	1.2693899E-01	3.9685770E-02	3.9010330E-01	1.5028754E-01	9.6123139E-02	3.3873934E-03	-2.1935898E-02	-2.3316048E-02
	43	2.4411373E-02	1.7241638E 00	-1.3701059E-01	1.6894940E 00	-7.0296531E-02	8.5862496E-02	-1.4239171E-02	-4.2148495E-01	5.5352817E-01
	44	-4.8145164E-02	-6.0331933E-01	3.4973319E-01	-2.4422564E 00	8.8822736E-02	1.7127422E-01	-3.6143475E-03	-2.8352675E-02	2.4097227E-02
	45	5.9229822E-02	1.5166540E-01	-1.6055041E-02	2.2636049E 00	-2.2826957E-03	3.5190927E-01	8.5707034E-03	1.0684366E-01	5.4236161E-02
	46	3.0463471E-02	1.3134516E-01	-1.1995734E-02	-1.0916577E 00	-2.1151800E-03	-3.5985172E-01	1.4753662E-02	-9.6335063E-03	-1.3087834E-01
	47	-5.3760013E-02	-5.6078715E 00	-3.6343274E-02	-4.4741791E 00	7.6252542E-02	-1.7447279E-02	2.0819968E-02	4.4089357E-01	-2.1826969E 00
	48	8.1882428E-02	-2.2121275E-02	-2.1988279E-02	9.0733957E 00	2.4135670E-01	-1.3982452E-03	9.0840532E-03	-1.3706098E-02	-1.1155174E-01
	49	-1.2118443E-01	-9.6829994E-01	6.6151013E-02	-3.1596620E 00	7.7578814E-03	-1.7547485E-02	-8.8886031E-03	-3.3361099E-02	-2.0896991E-01
	50	-5.5816854E-02	-1.5771428E-01		1.9499765E-01	9.1543974E-03		-2.2976347E-02	1.0489693E-03	3.0255853E-01
	51		4.6675286E 00		2.8533068E 00	-1.0143987E-01			-7.3638140E-02	1.8321005E 00
	52				-7.2130730E 00	-2.1709381E-01			2.7759729E-02	6.6903714E-02

GEOGRAPHICAL VARIATION

	Harmonic	5		6		7		8	
	K \ S	9	10	11	12	13	14	15	16
I	0	1.2294404E-01	1.8570814E-01	-1.2821390E-01	2.0834956E-02	-2.9877301E-02	-8.9410645E-02	7.4030024E-02	5.9866956E-03
	1	-1.9470451E-01	-3.1806050E-02	-7.7051545E-02	-1.6888171E-01	1.5374735E-01	1.3700190E-02	2.8168842E-02	1.1642151E-01
	2	-4.2801775E-01	-5.0279433E-01	4.1772982E-01	5.0130493E-02	2.7636009E-02	2.8135349E-01	-2.9981740E-01	-1.0622260E-01
	3	2.0296355E-01	2.6779590E-02	9.1446990E-02	1.8121314E-01	-1.7257506E-01	-1.9302008E-02	-3.2613944E-02	-1.3508137E-01
	4	3.2433871E-01	3.3586175E-01	-2.9030565E-01	-7.0194983E-02		-1.9744847E-01	2.3852901E-01	1.0831849E-01

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN f_oF2 (Mc/s)

MAY 1965

TABLE 2

TIME VARIATION

GEOGRAPHICAL VARIATION

Harmonic		0	1	1	2	2	3	3
	K \ S	0	1	2	3	4	5	6
I	0	3.0559009E 00	-9.9537239E-02	-2.2723986E-01	1.3450135E-02	-1.3684649E-01	1.0924065E-02	8.4607852E-03
	1	-5.6541790E-01	-1.3924938E-01	-4.9286775E-01	3.3252044E-01	-3.5727256E-01	1.1311723E-01	3.9256659E-02
	2	1.5556525E 00	7.0397729E-01	2.4678908E 00	-7.2369003E-02	-1.7997132E-01	-3.2253738E-01	-4.2878522E-01
	3	2.1117903E 00	4.2884253E-01	1.7668379E 00	-1.7702541E 00	1.3333008E 00	-4.7632480E-01	-9.9047928E-02
	4	-4.6394492E 00	-1.6861983E 00	-6.2782380E 00	-8.5217060E-01	1.3721730E 00	1.3892946E 00	1.2925914E 00
	5	-3.4269640E 00	-3.2992947E-01	-2.7857231E 00	2.7964707E 00	-1.7320516E 00	7.5597274E-01	2.4270367E-01
	6	4.9858385E 00	1.9730884E 00	6.5662591E 00	1.9715147E 00	-1.7252292E 00	-2.1038308E 00	-1.3011919E 00
	7	1.8250345E 00	6.8486103E-02	1.3838101E 00	-1.3433637E 00	7.5618707E-01	-3.9967473E-01	-1.6863622E-01
	8	-1.8665936E 00	-8.7110628E-01	-2.5822495E 00	-1.0637562E 00	6.6960744E-01	1.0384027E 00	4.2898654E-01
II	9	8.5712378E-03	2.0821519E-02	5.6586779E-02	-1.6754571E-02	-7.8114505E-03	2.3795238E-03	8.1695879E-04
	10	6.8505786E-02	4.6212000E-02	7.2491786E-02	-5.2118590E-02	-6.7942515E-03	-1.3945176E-02	2.9314784E-02
	11	1.3928022E-01	-6.8040587E-02	1.1646080E-01	-8.9316847E-03	-1.2686270E-02	3.0915315E-02	-4.4111989E-02
	12	-4.6435967E-01	-2.9698251E-01	-1.0668282E 00	1.6493202E-02	-8.6274012E-02	7.9108056E-02	1.2413474E-01
	13	-7.4297113E-02	-4.4182554E-01	-9.5617281E-01	1.1968021E-01	-2.4412202E-02	6.9343709E-03	-1.5986755E-01
	14	-5.5154129E-01	-6.5425093E-01	-8.9993812E-02	9.0945606E-01	5.0844567E-02	1.4781815E-01	-4.0787227E-01
	15	-1.0136724E 00	4.5028366E-01	-1.8176373E-01	1.3364653E-02	8.6929336E-02	-1.6254090E-01	3.0102523E-01
	16	3.3219310E 00	1.6506275E 00	6.5425190E 00	4.5491710E-02	1.9202726E-01	-7.2879466E-01	-6.2450481E-01
	17	3.0919728E-01	2.3167844E 00	3.5971982E 00	-9.0235139E-01	9.0734266E-02	-1.5415865E-02	8.0157672E-01
	18	1.1836385E 00	2.7088048E 00	-1.6449137E 00	-3.6573747E 00	-1.1253110E-02	-3.9327565E-01	1.0950977E 00
	19	1.9516807E 00	-1.0827283E 00	-1.8953052E-01	7.1309640E-02	-1.3145883E-01	3.1338031E-01	-6.2769467E-01
	20	-5.8949299E 00	-2.9218304E 00	-1.0662779E 01	-2.3888524E-01	-2.0985626E-01	1.5213209E 00	8.5756834E-01
	21	5.4728789E-02	-4.2358541E 00	-4.7327757E 00	2.0063916E 00	-1.5196130E-01	1.8331597E-02	-1.0465517E 00
	22	-8.5269139E-01	-4.4343418E 00	4.0674105E 00	5.2206688E 00	-9.5441453E-04	3.6931156E-01	-1.1938678E 00
	23	-1.2960993E 00	6.4512700E-01	2.4145171E-01	-5.6929902E-02	8.9407423E-02	-1.4798487E-01	4.6688910E-01
	24	3.1397775E 00	1.7238405E 00	5.5543014E 00	1.3960849E-01	1.3179394E-01	-9.3464407E-01	-3.7768733E-01
	25		2.5083553E 00	2.3114450E 00	-1.3122741E 00	7.5209102E-02	-4.7272750E-02	3.2247705E-01
	26		2.4624468E 00	-2.5435384E 00	-2.4212615E 00	9.0238763E-03	-9.9591310E-02	5.2523701E-01
III	27		-1.6223786E-02	1.2774937E-02	-1.6001965E-02	-4.2853578E-04	-5.5452777E-04	5.6044338E-03
	28		-2.8960375E-03	1.2613363E-02	-3.0183401E-03	-7.6167935E-04	1.0770247E-04	1.2597909E-02
	29		-1.4163669E-01	-1.3632342E-01	2.0047174E-02	1.9985524E-03	9.6870257E-04	-2.0917472E-02
	30		-3.4140987E-02	-1.1552929E-01	3.0081366E-02	-2.3427007E-03	1.3297167E-03	-2.6870391E-02
	31		2.1416375E-02	5.9513210E-02	1.4466410E-01	6.5648562E-03	1.8258803E-03	-6.8197308E-02
	32		1.1837760E-01	-1.1323479E-01	5.1132606E-03	2.7933834E-04	1.2083044E-03	-4.6787316E-02
	33		2.9547067E-01	2.3649900E-01	-6.9918138E-02	-2.7946622E-03	-3.6412210E-03	5.7769048E-02
	34		1.7574100E-01	2.7129286E-01	2.2475084E-02	7.2812105E-03	-4.9373520E-03	1.3881982E-01
	35			1.8838665E-02	-2.7897050E-01	-1.6768087E-02		
	36			-3.5203367E-02				

GEOGRAPHICAL VARIATION

Harmonic		4	4	5	5	6	6
	K \ S	7	8	9	10	11	12
I	0	1.7982363E-02	-6.9131937E-04	1.0945326E-02	2.0623846E-02	-9.9729823E-03	4.8127016E-03
	1	5.3350960E-02	6.1657339E-02	-3.1079321E-02	-1.5172883E-02	-1.1312138E-03	-2.1899791E-02
	2	-3.4722354E-02	-1.2298435E-02	-9.9762436E-03	-2.8691247E-02	1.6933491E-02	-3.8314582E-03
	3	-7.1425568E-02	-6.2354687E-02	2.7336151E-02	1.3505482E-02	1.3013486E-03	2.1710232E-02

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude.

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN M(3000)F2

MAY 1965

MAY 1965 UT = 00

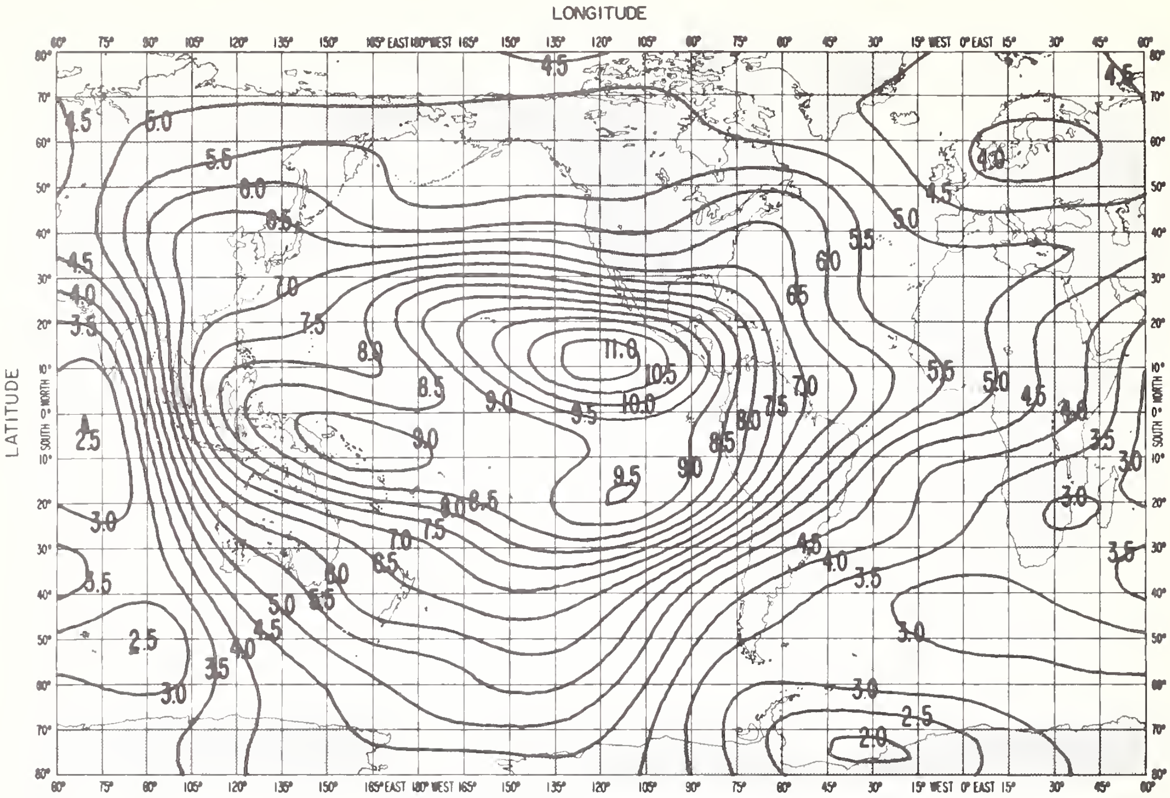

FIG. 1 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

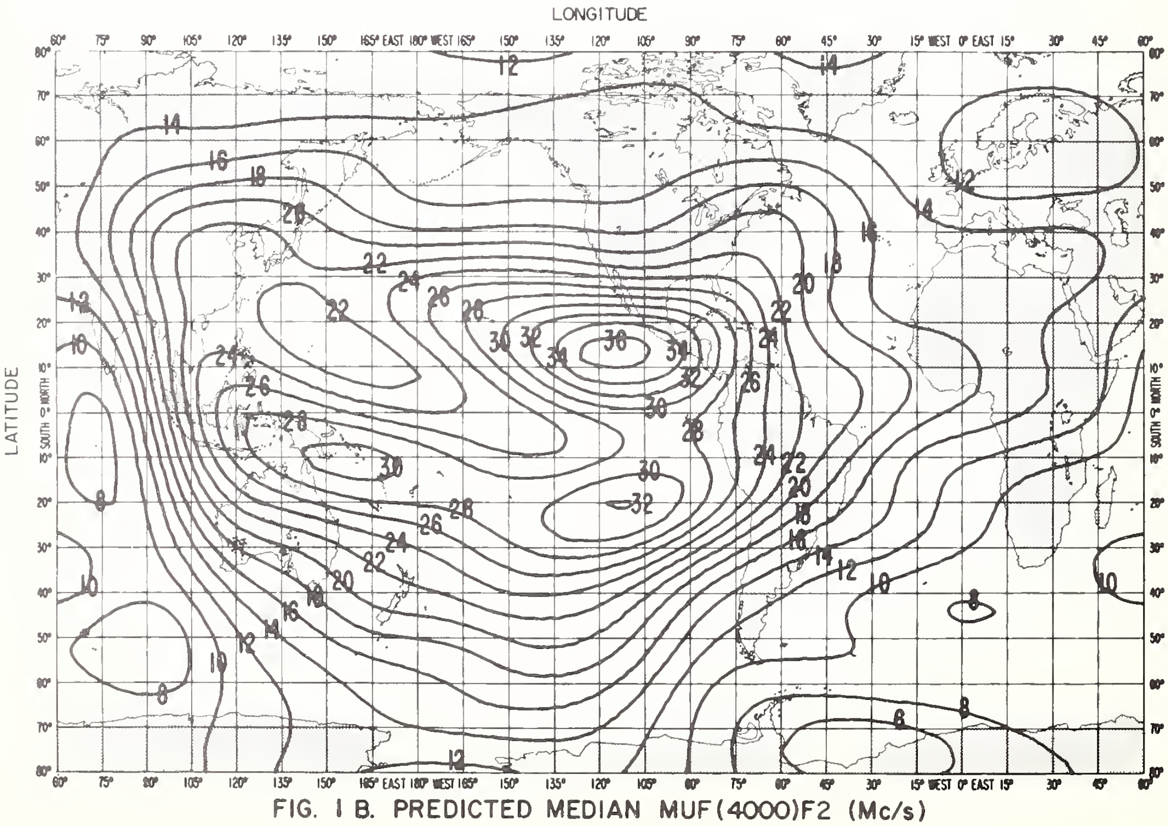

FIG. 1 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 02

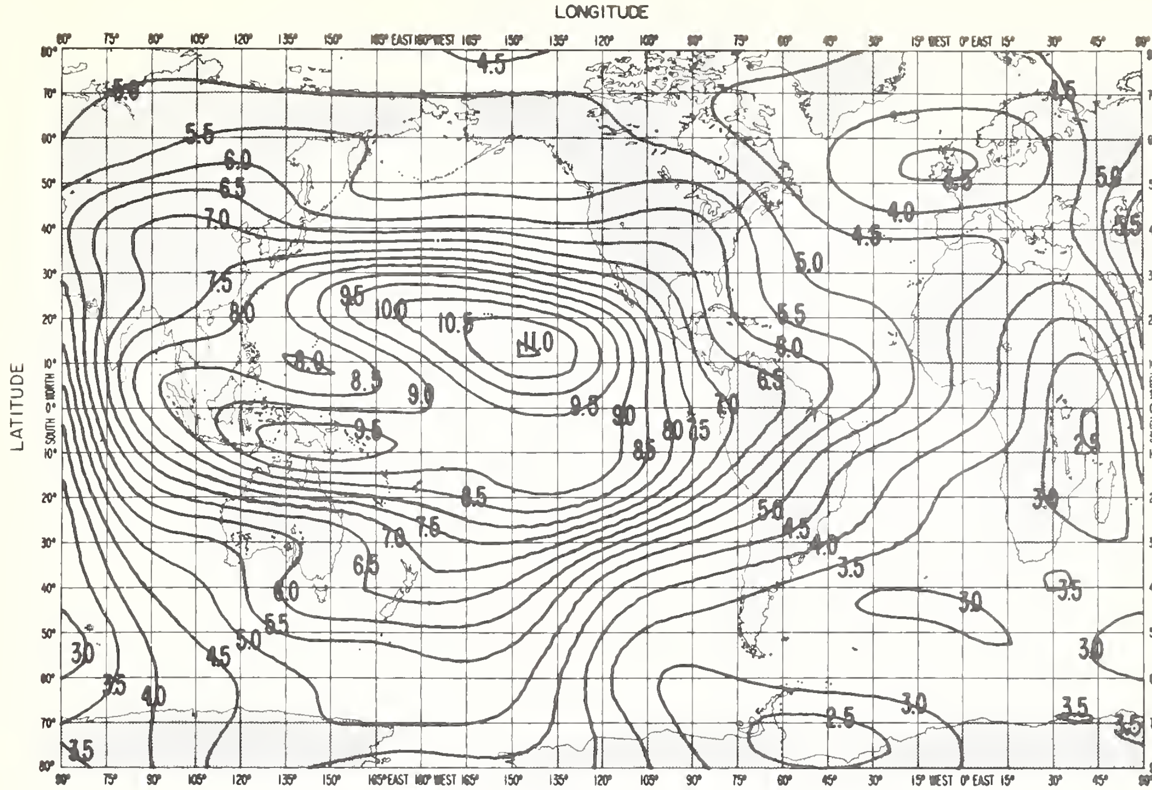

FIG. 2 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

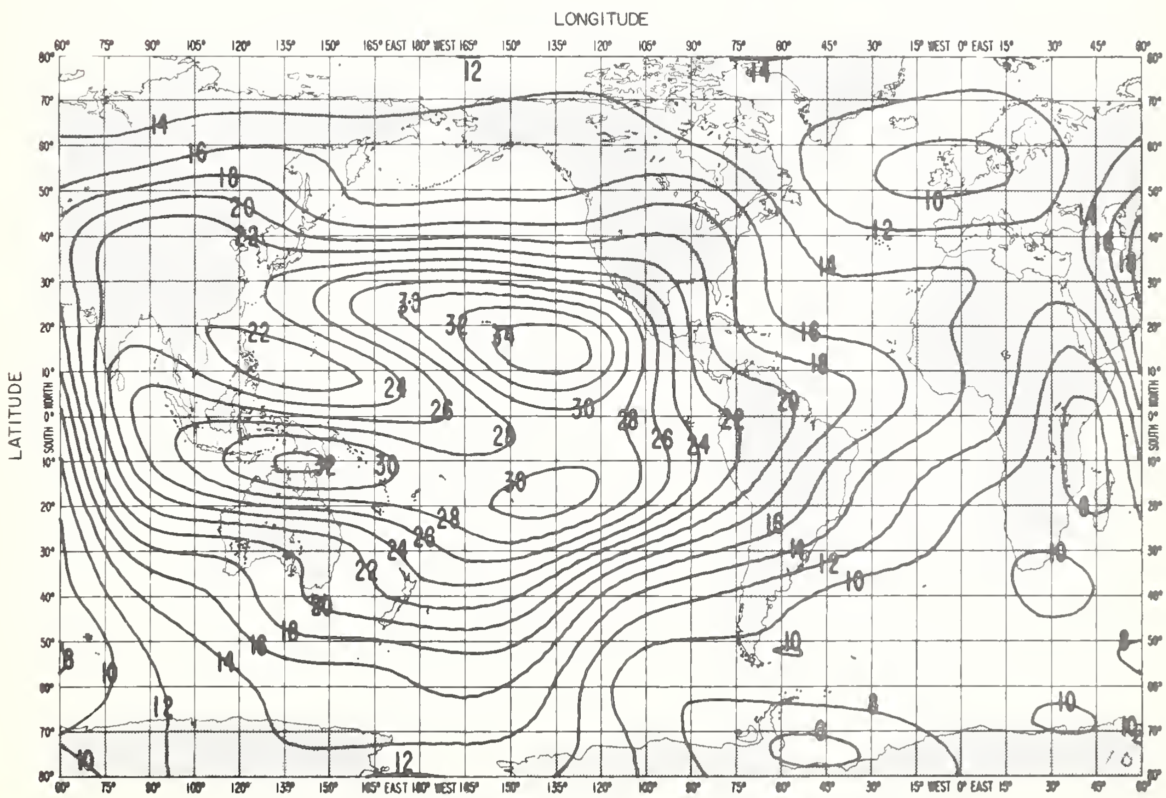

FIG. 2 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 04

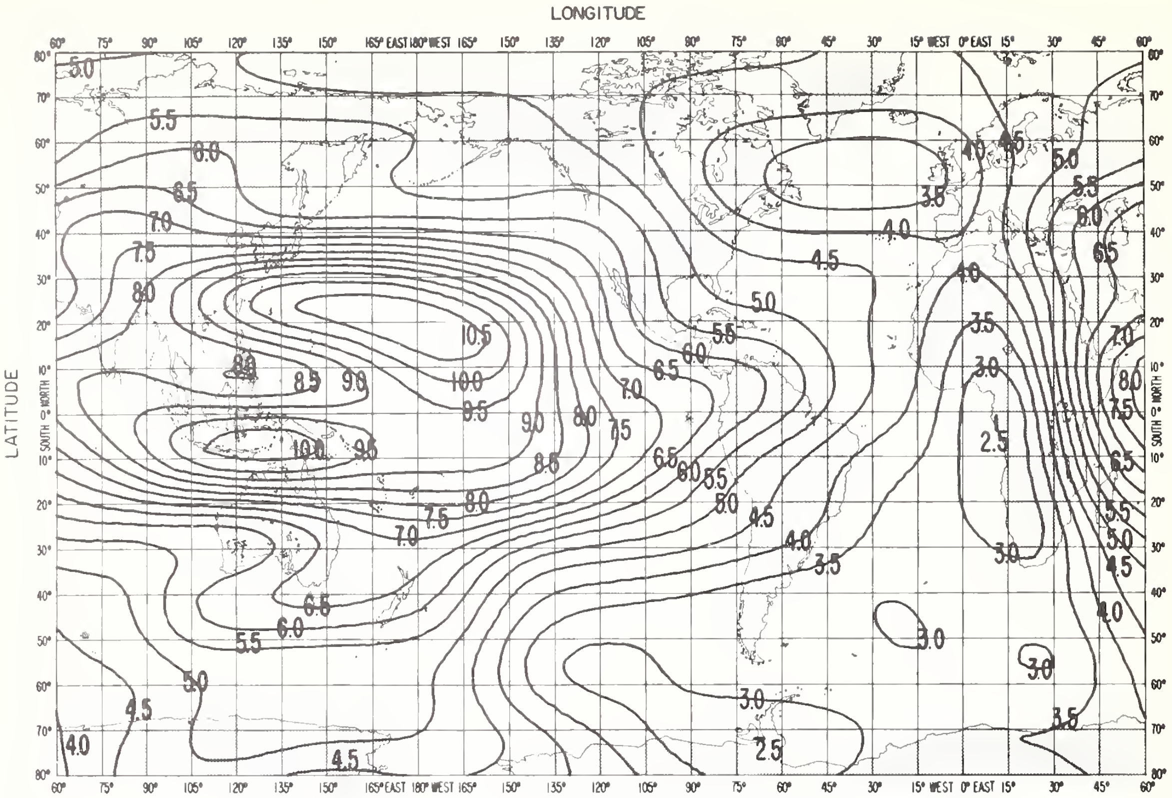

FIG. 3 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

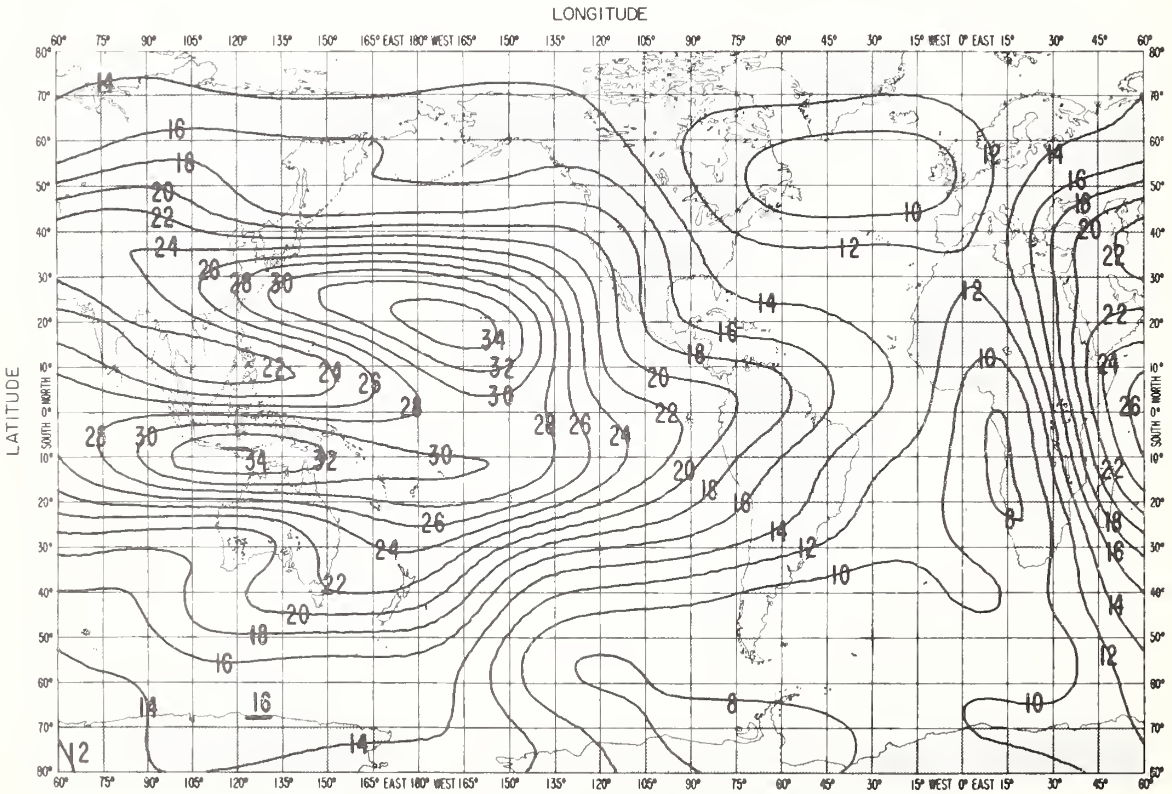

FIG. 3 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 06

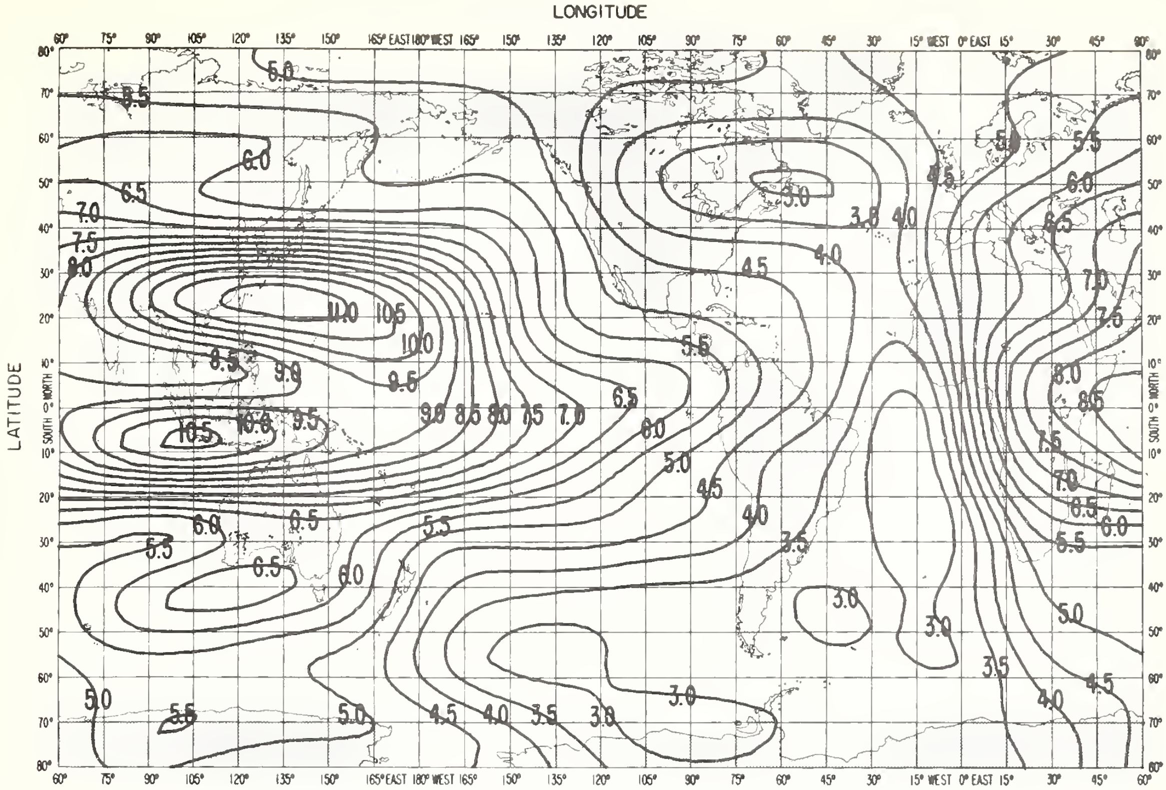

FIG. 4 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

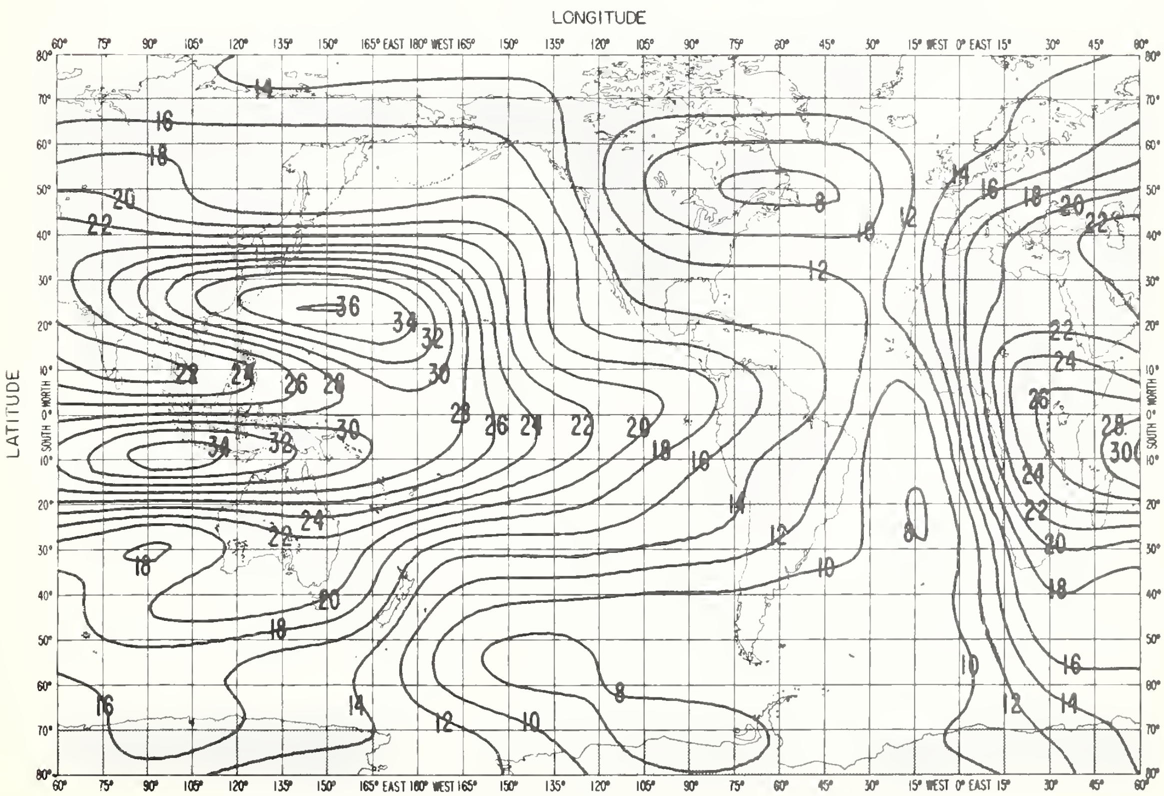

FIG. 4 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 08

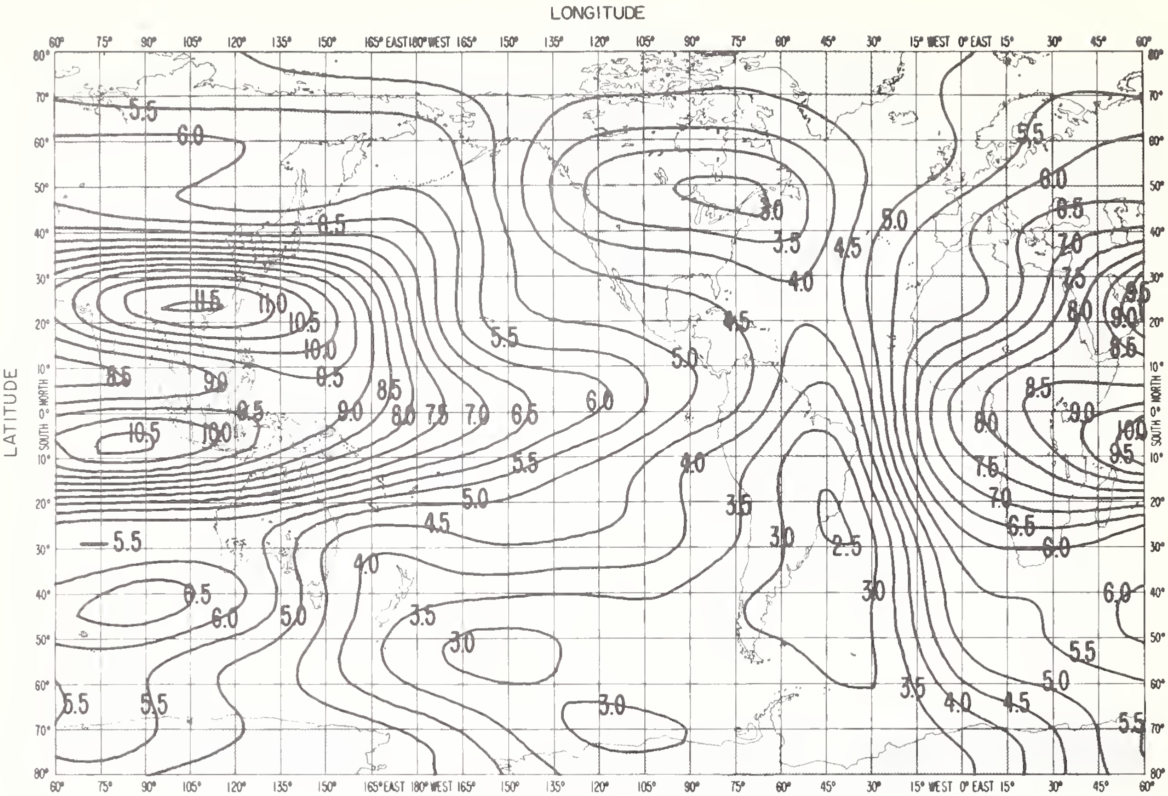

FIG. 5 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

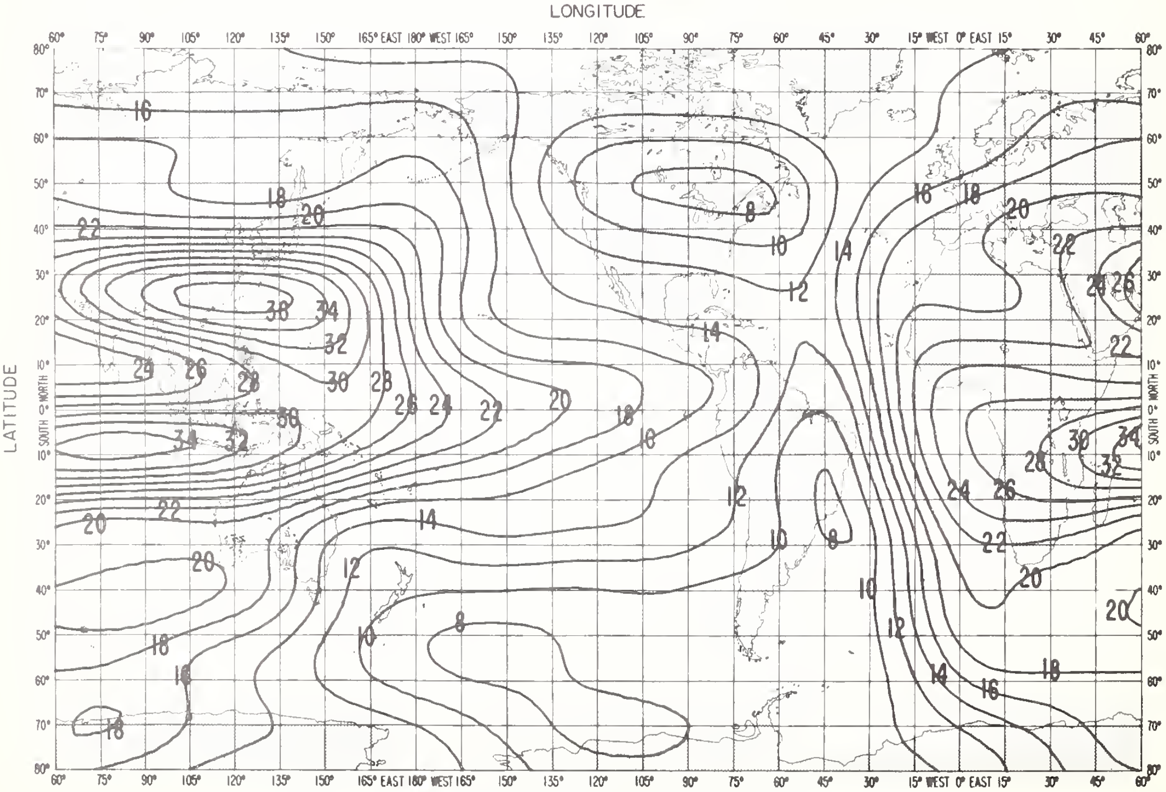

FIG. 5 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 10

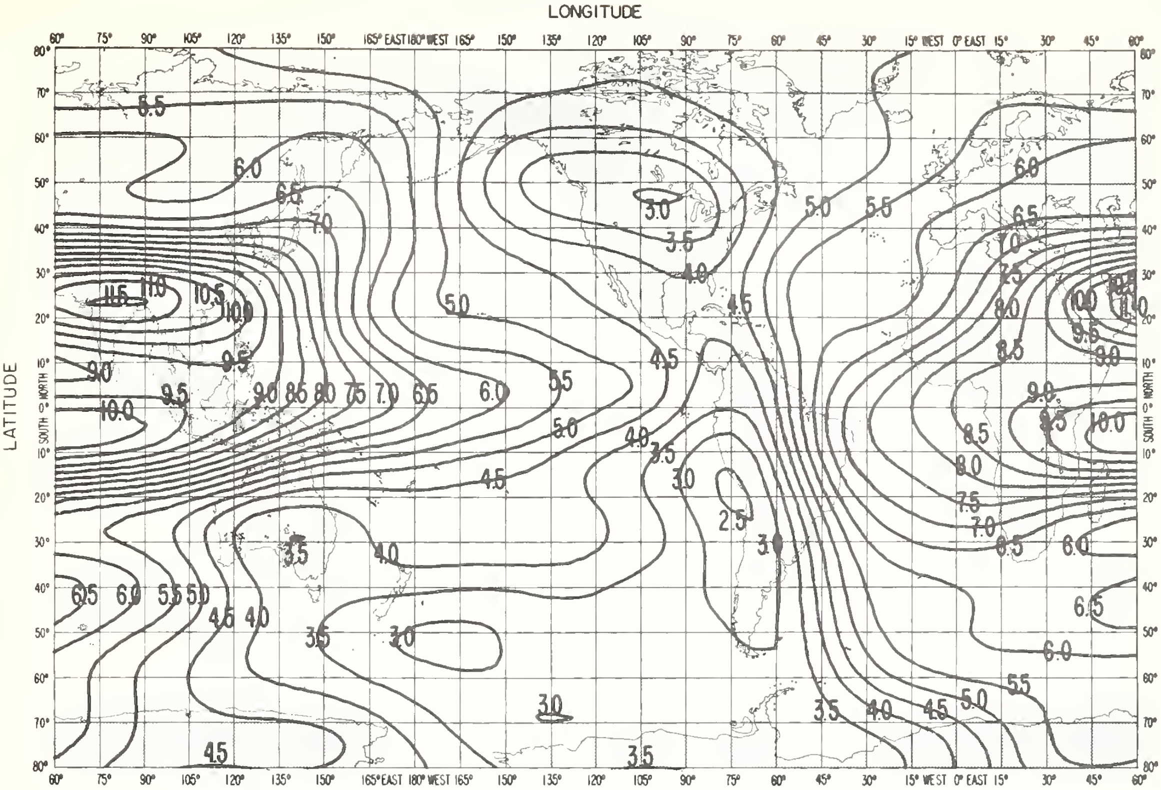

FIG. 6 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

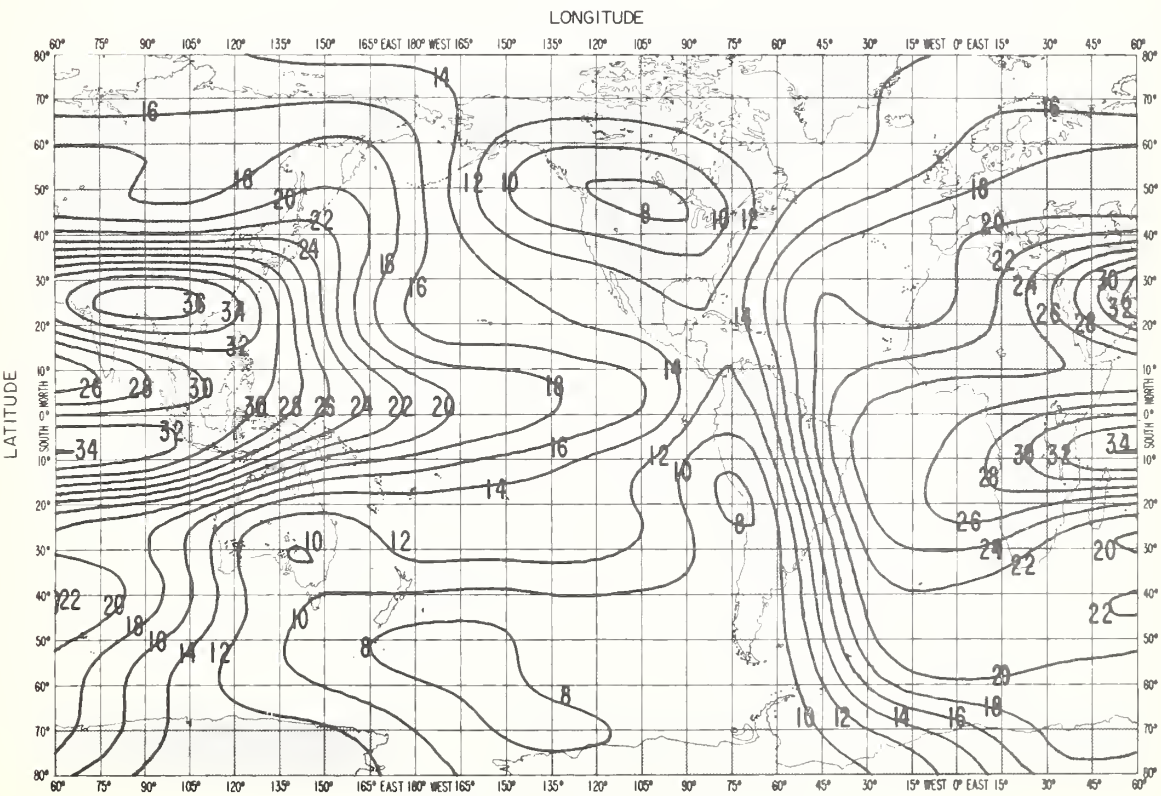

FIG. 6 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 12

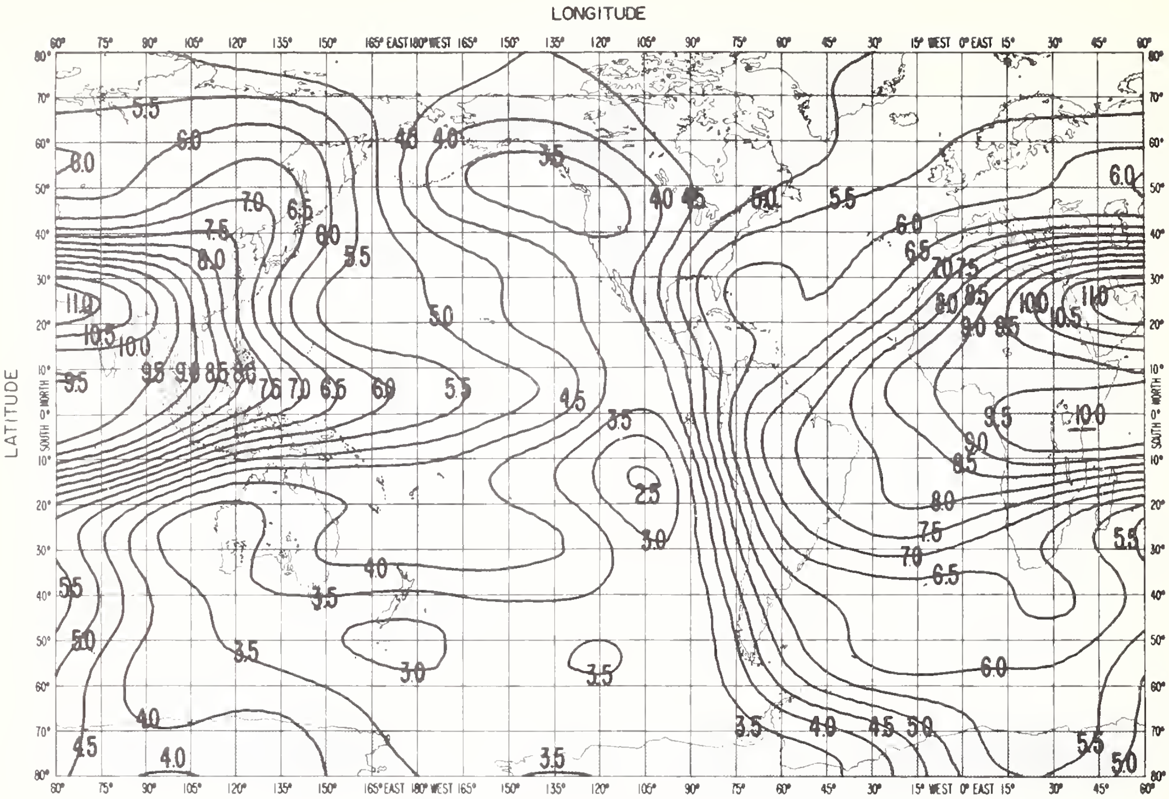

FIG. 7 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

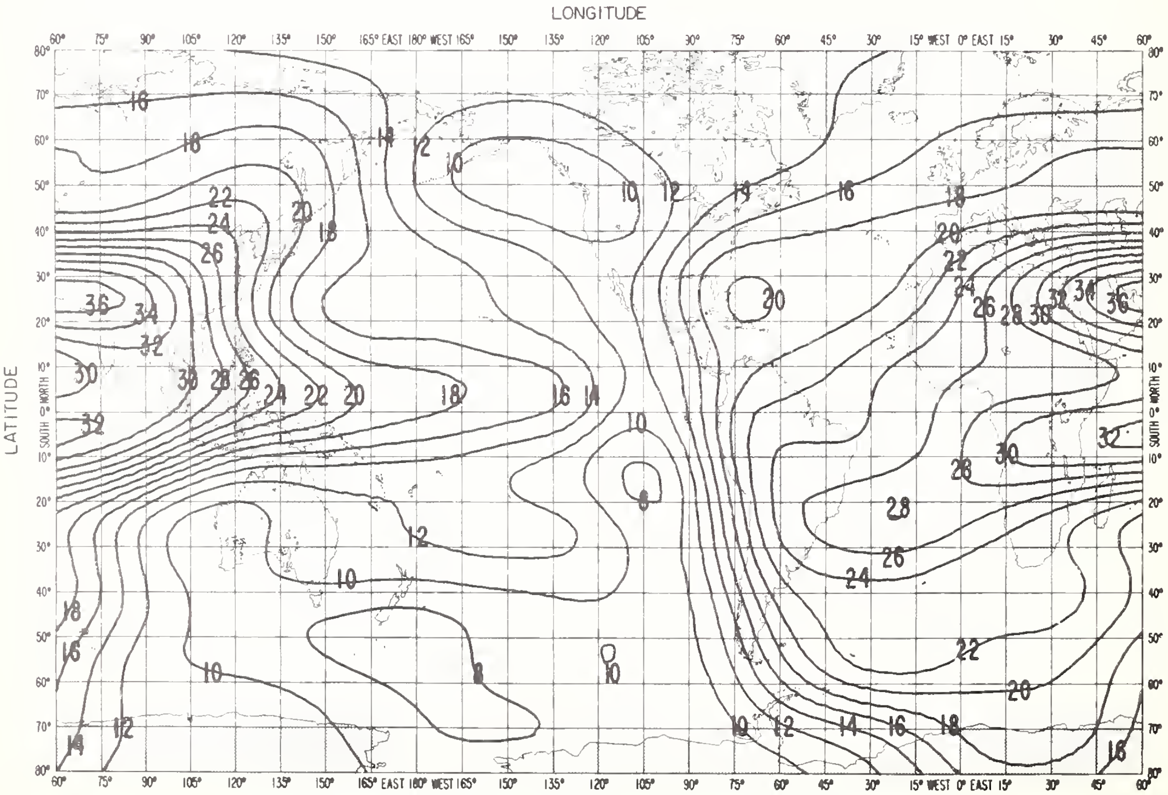

FIG. 7 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 14

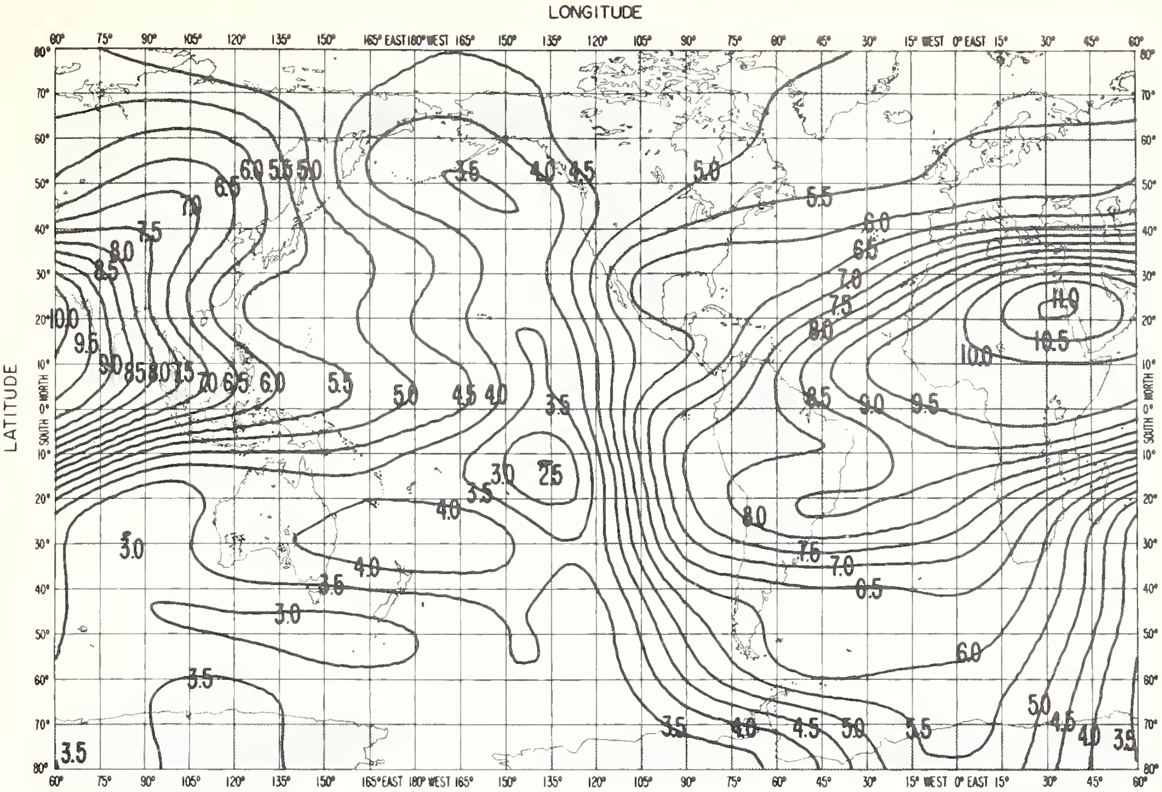

FIG. 8 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

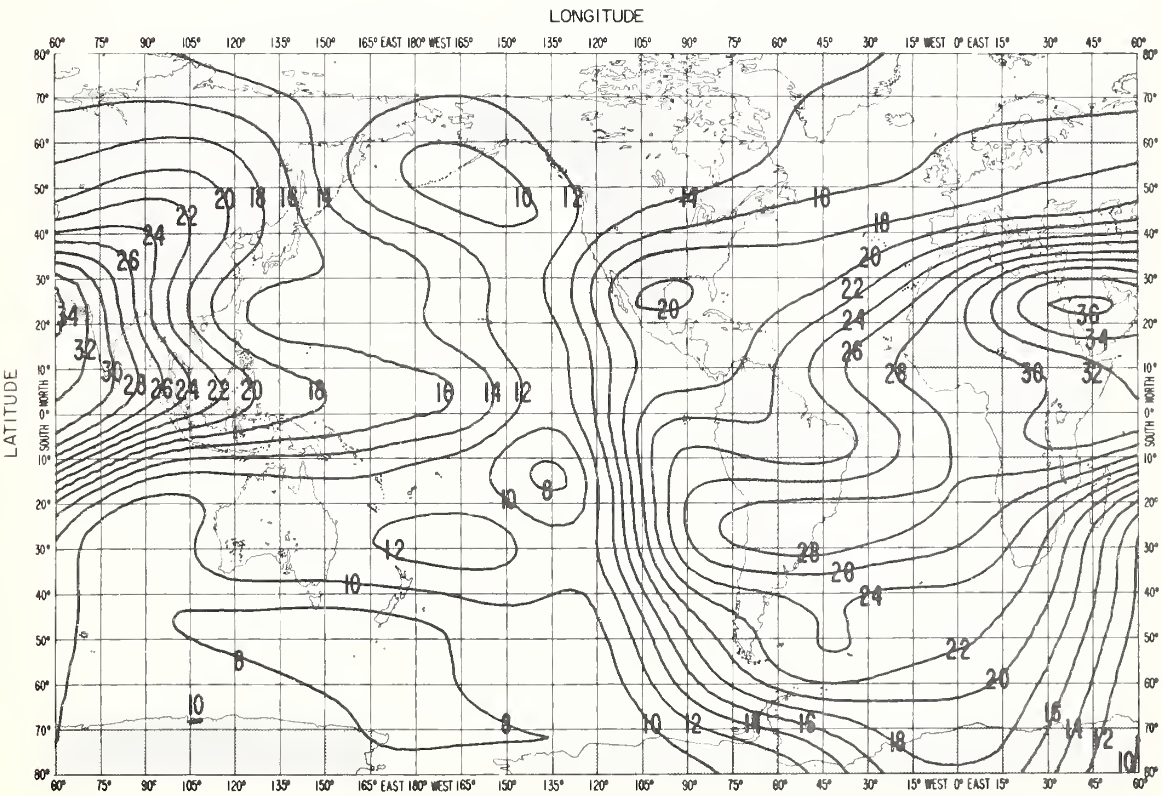

FIG. 8 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 16

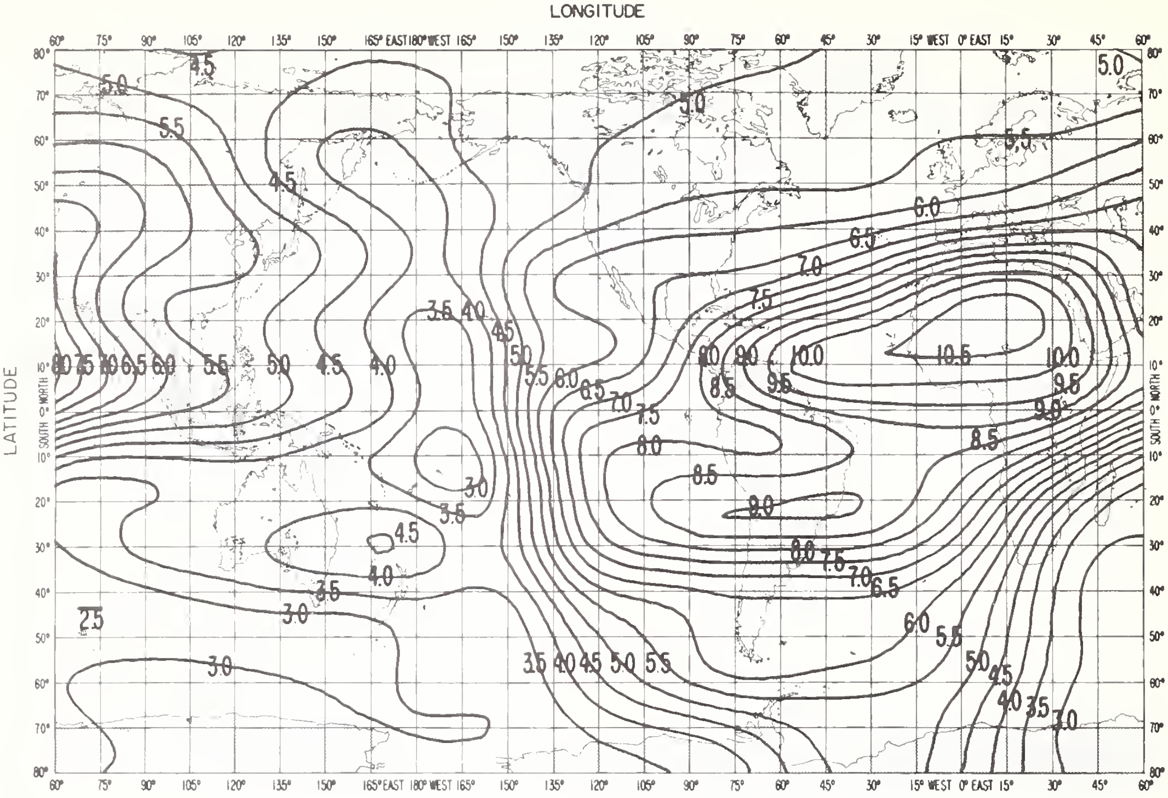

FIG. 9 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

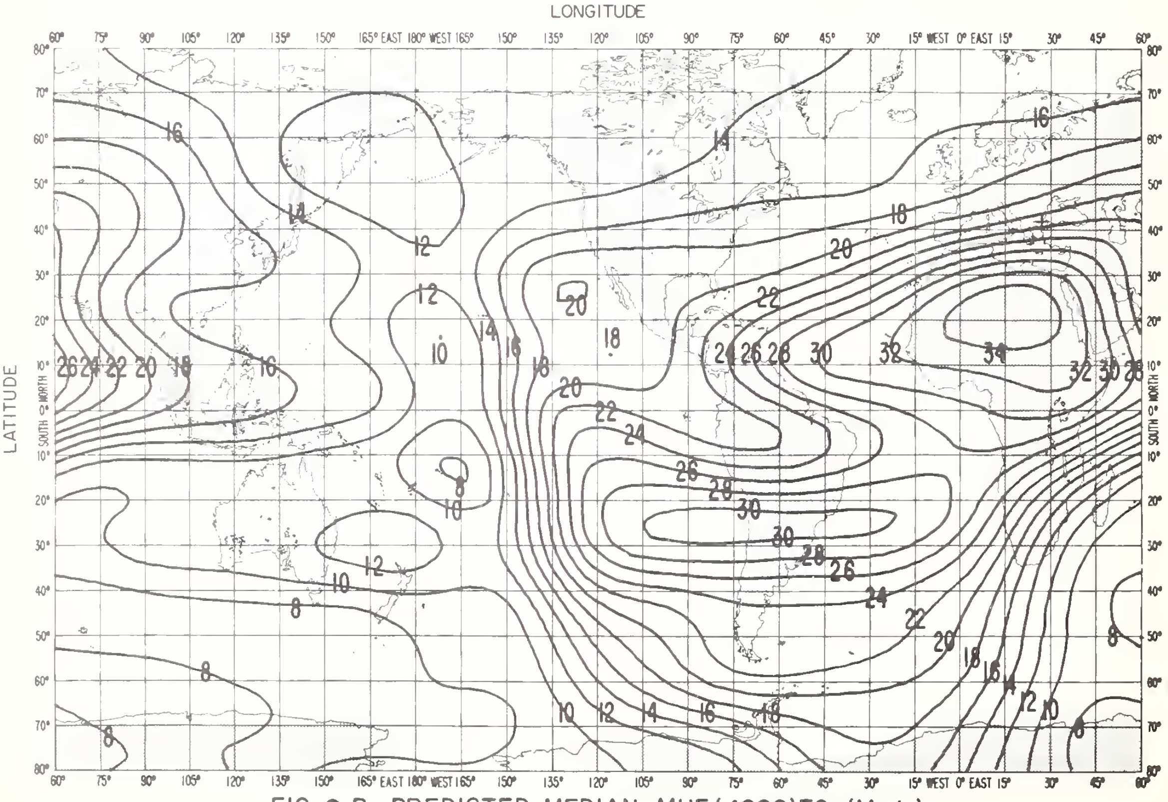

FIG. 9 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 18

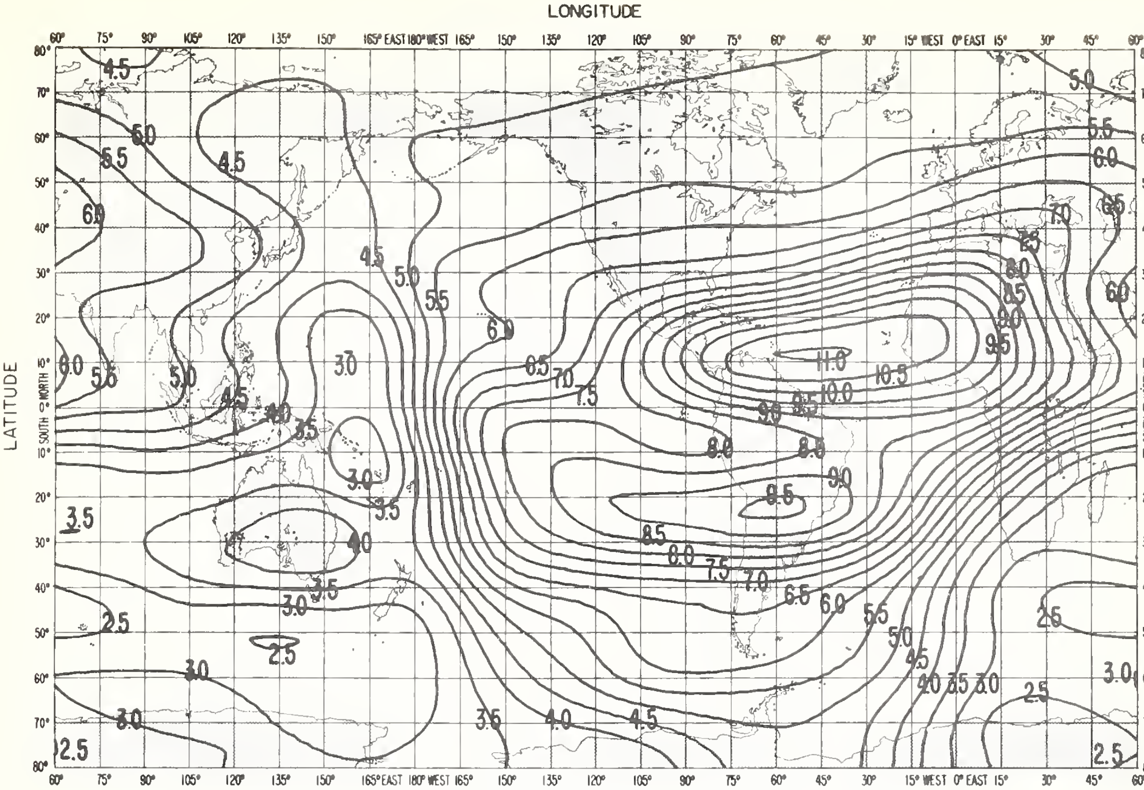

FIG. 10 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

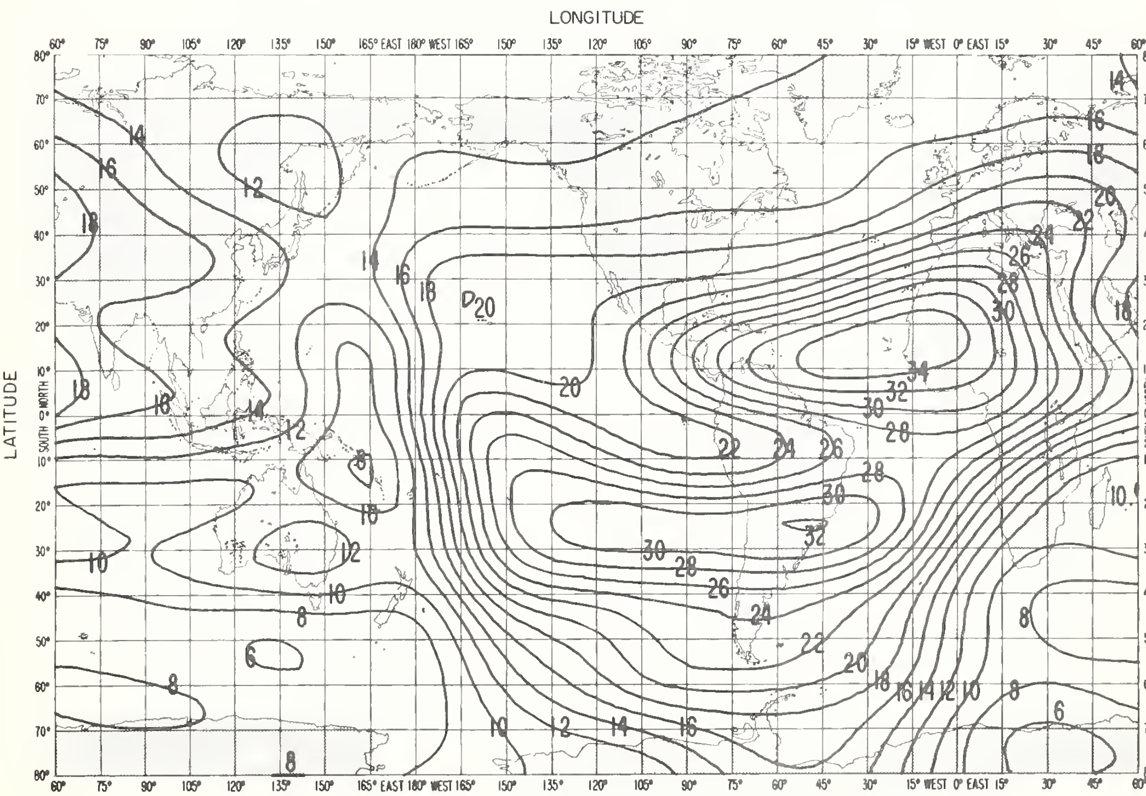

FIG. 10 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965   UT = 20

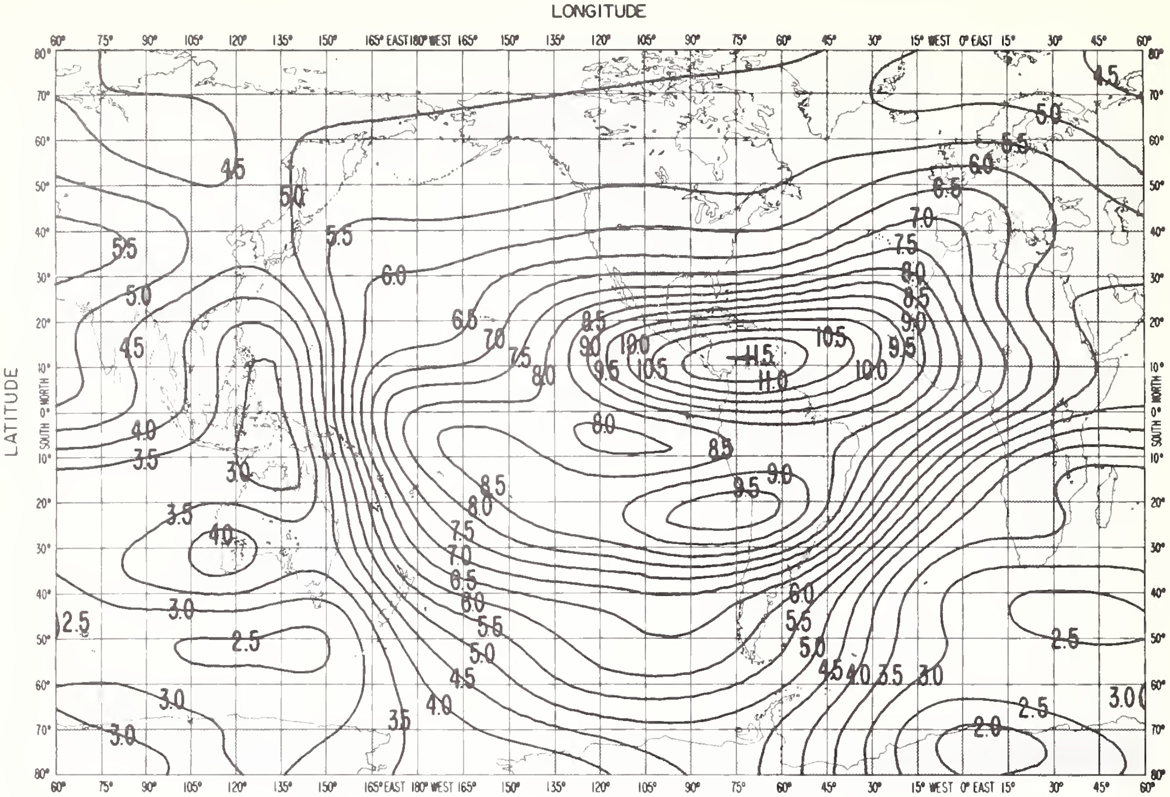

FIG.11 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

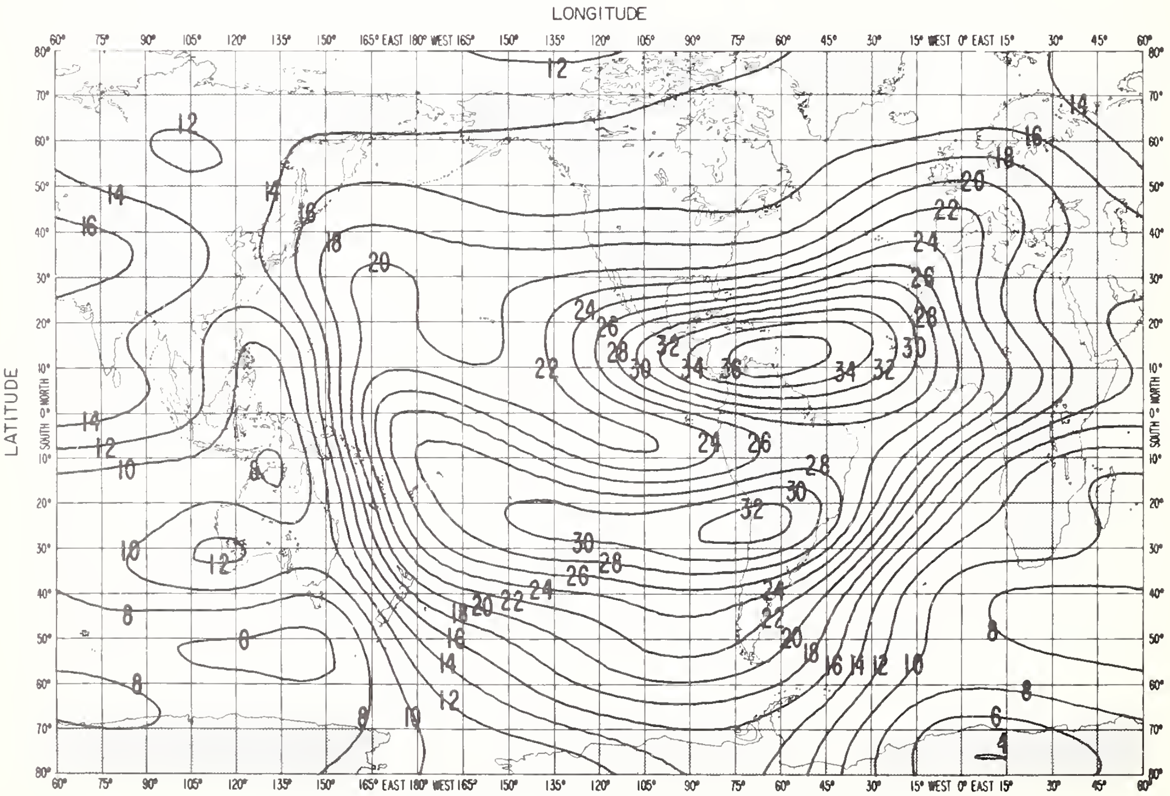

FIG.11 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 22

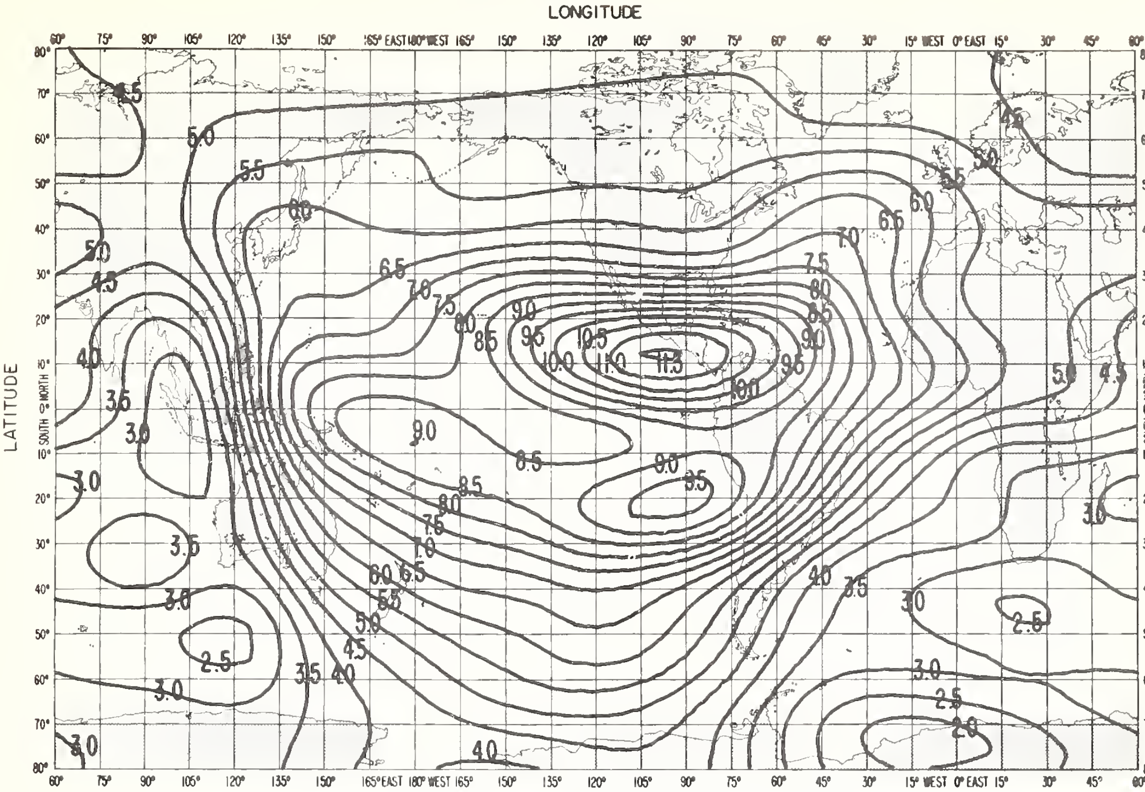

FIG.12 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

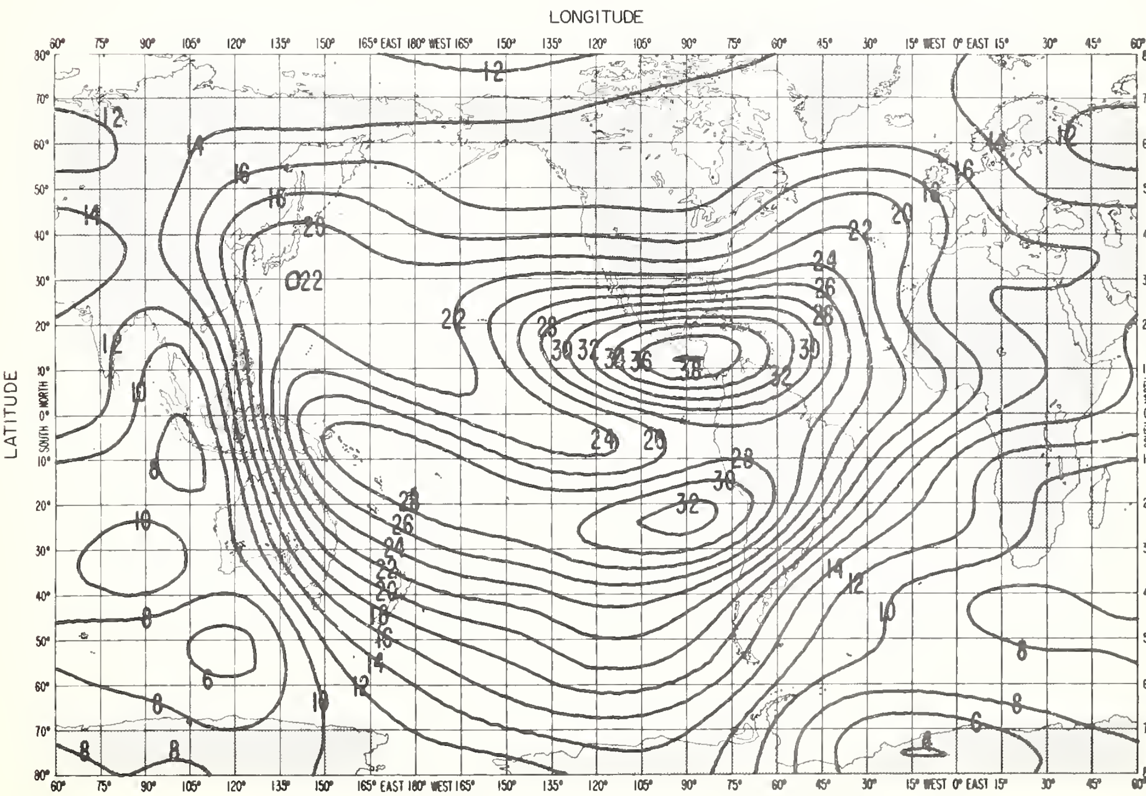

FIG.12 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 00

NORTH POLAR AREA

SOUTH POLAR AREA

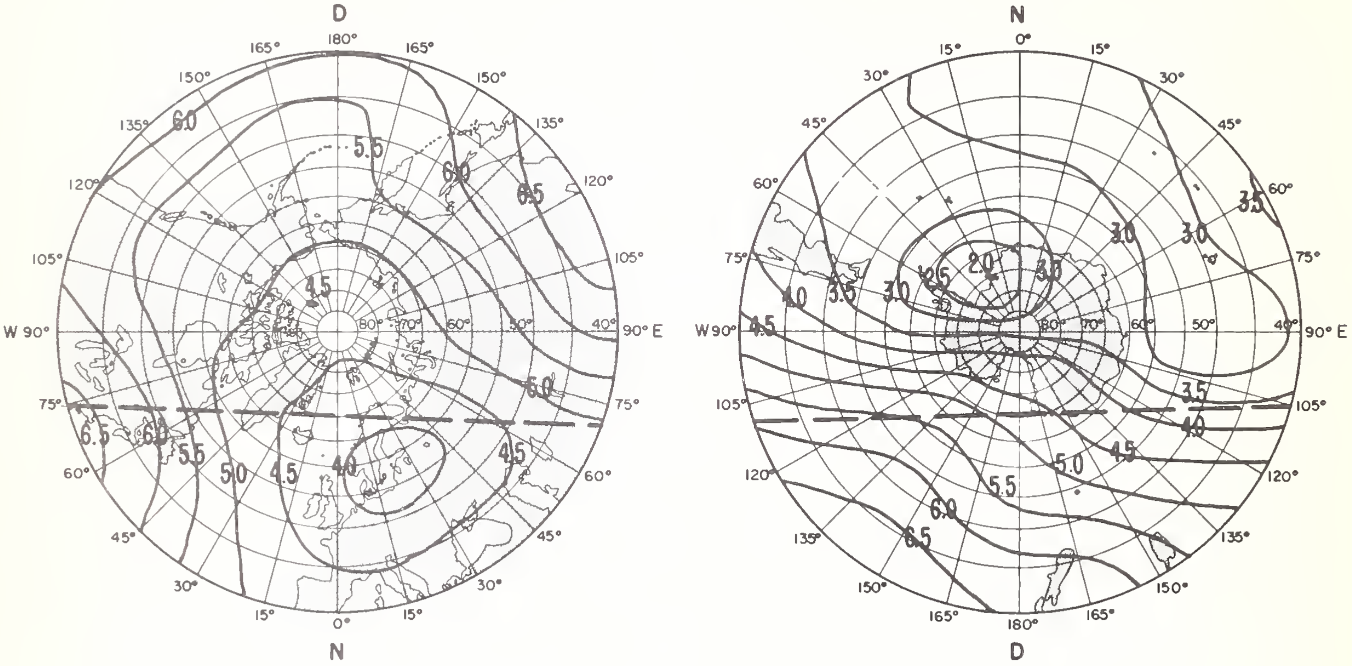

FIG. 13A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

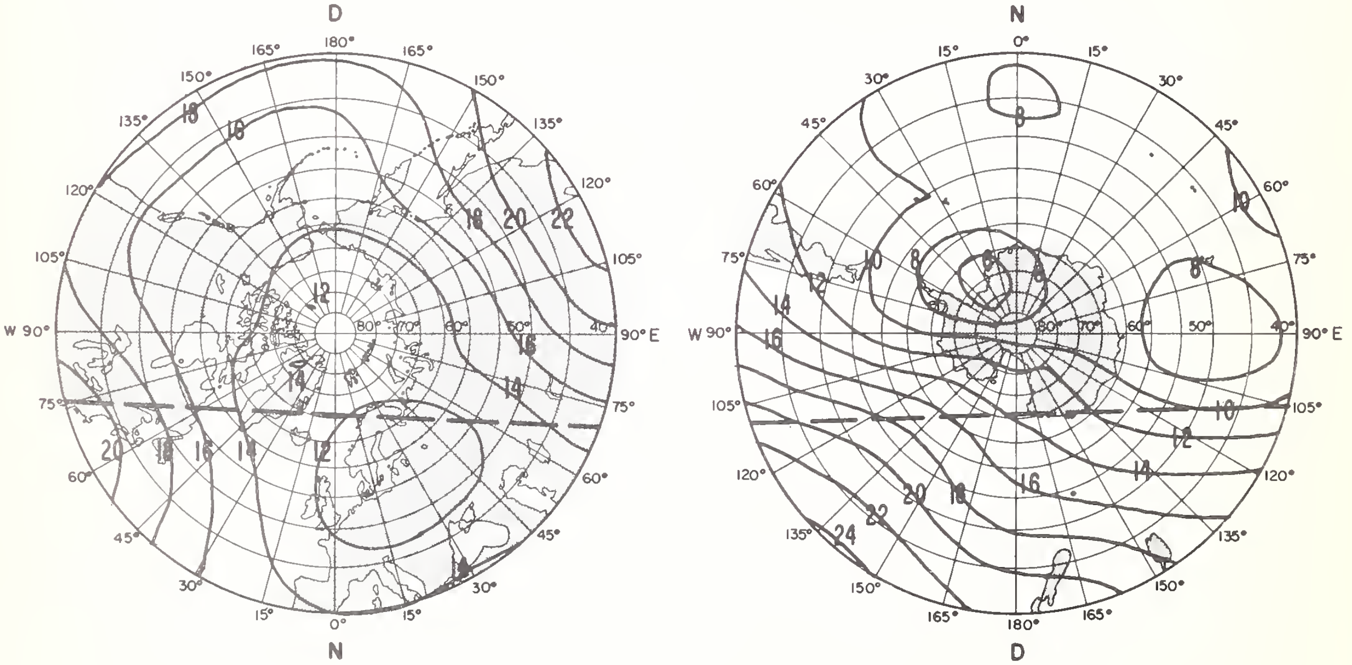

FIG. 13B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 02

NORTH POLAR AREA

SOUTH POLAR AREA

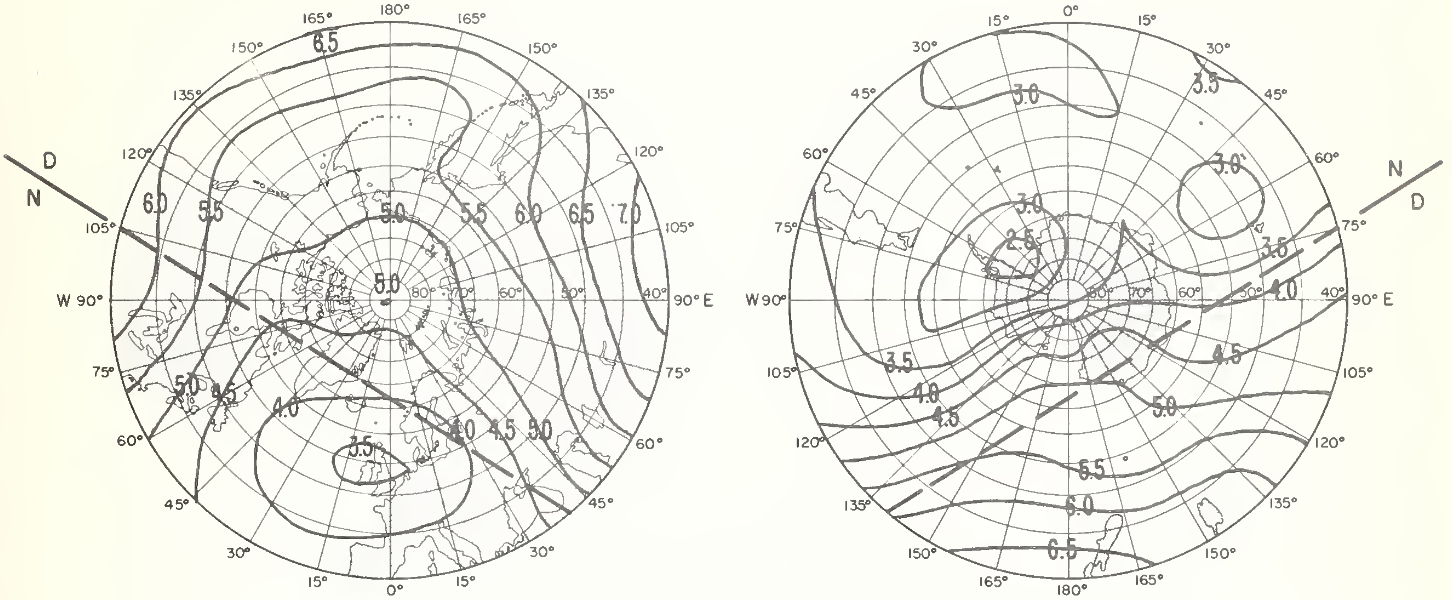

FIG. 14 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

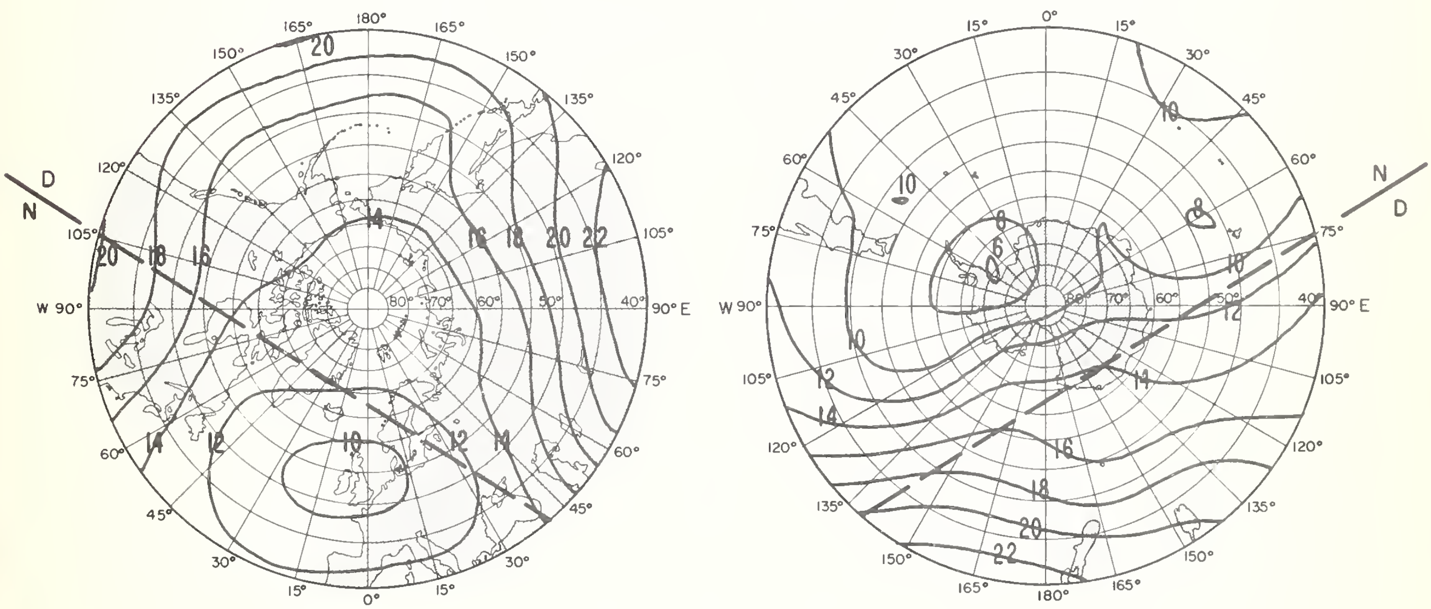

FIG. 14 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 04

NORTH POLAR AREA SOUTH POLAR AREA

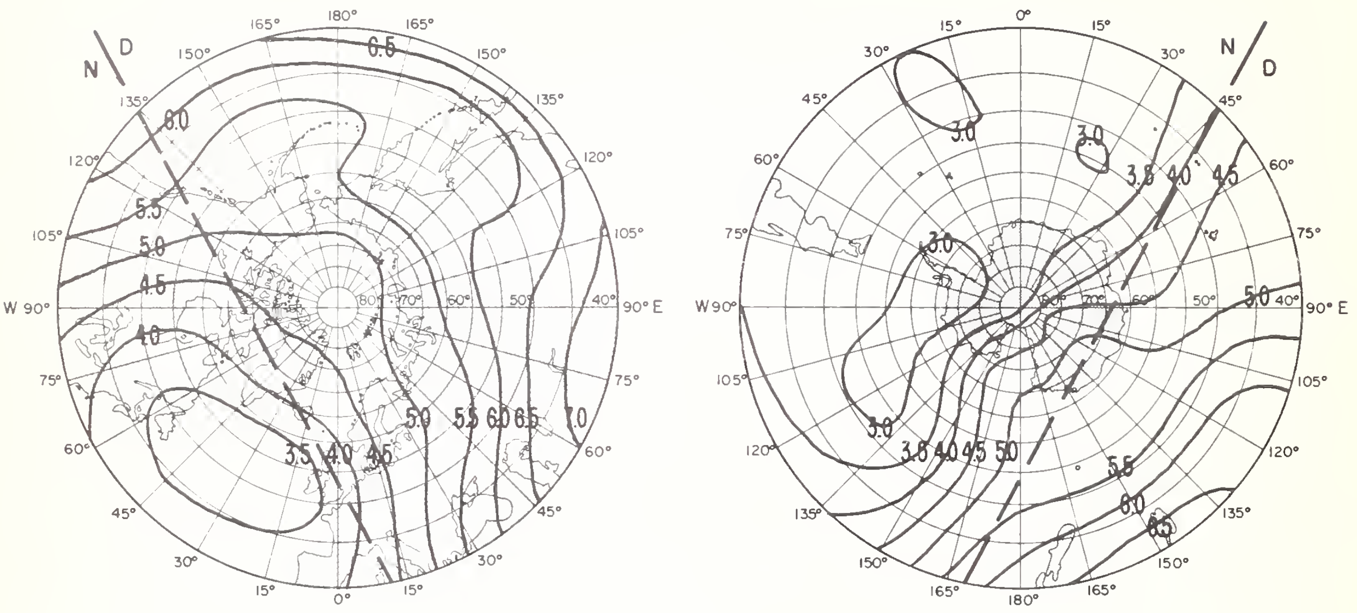

FIG. 15A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

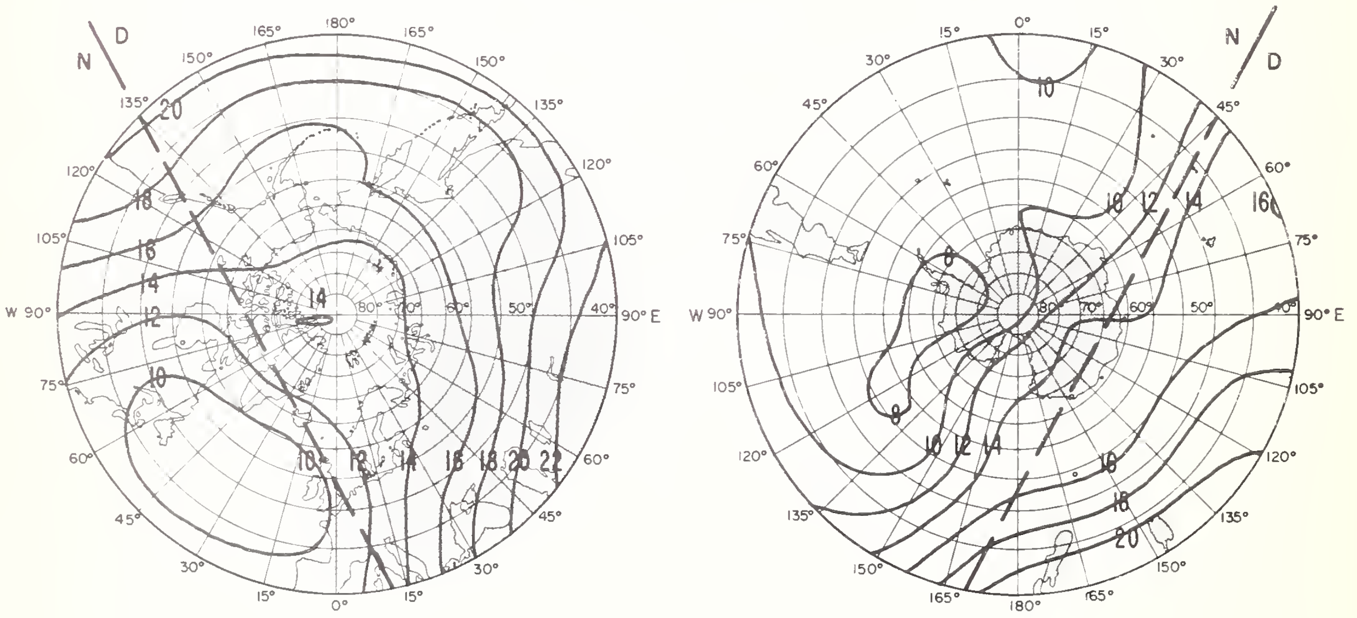

FIG. 15B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

MAY 1965 UT = 06

NORTH POLAR AREA

SOUTH POLAR AREA

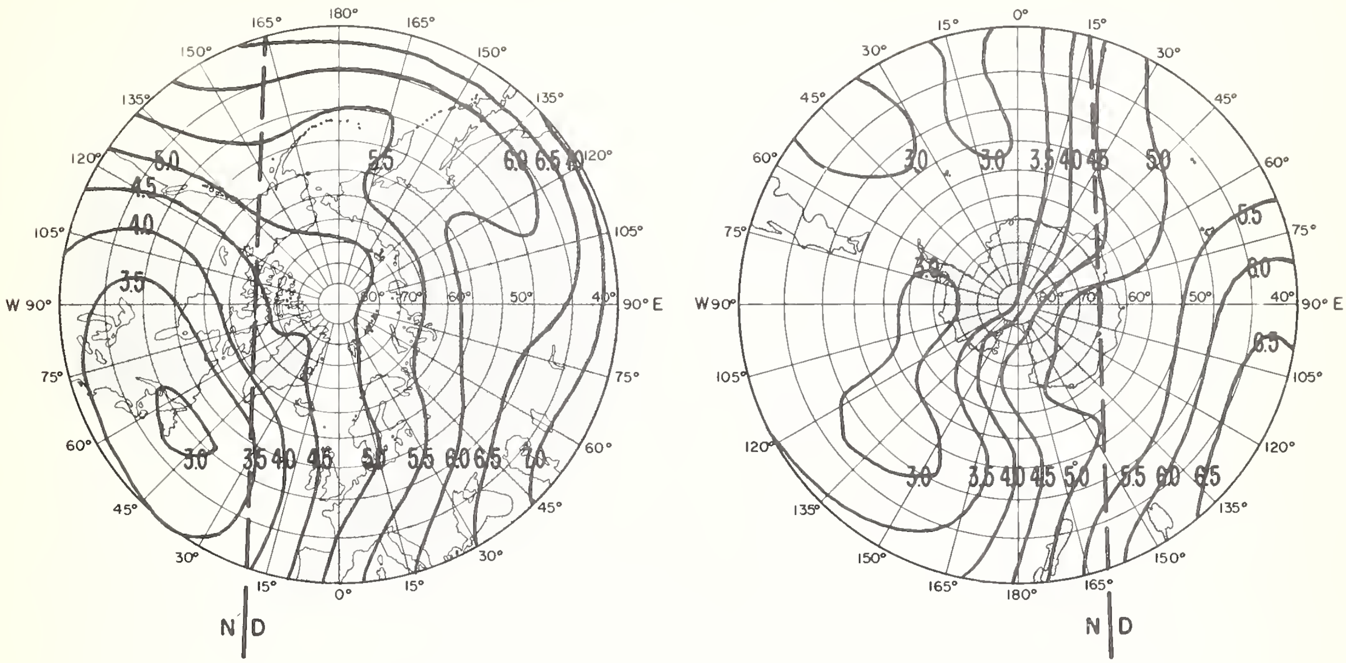

FIG. 16 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

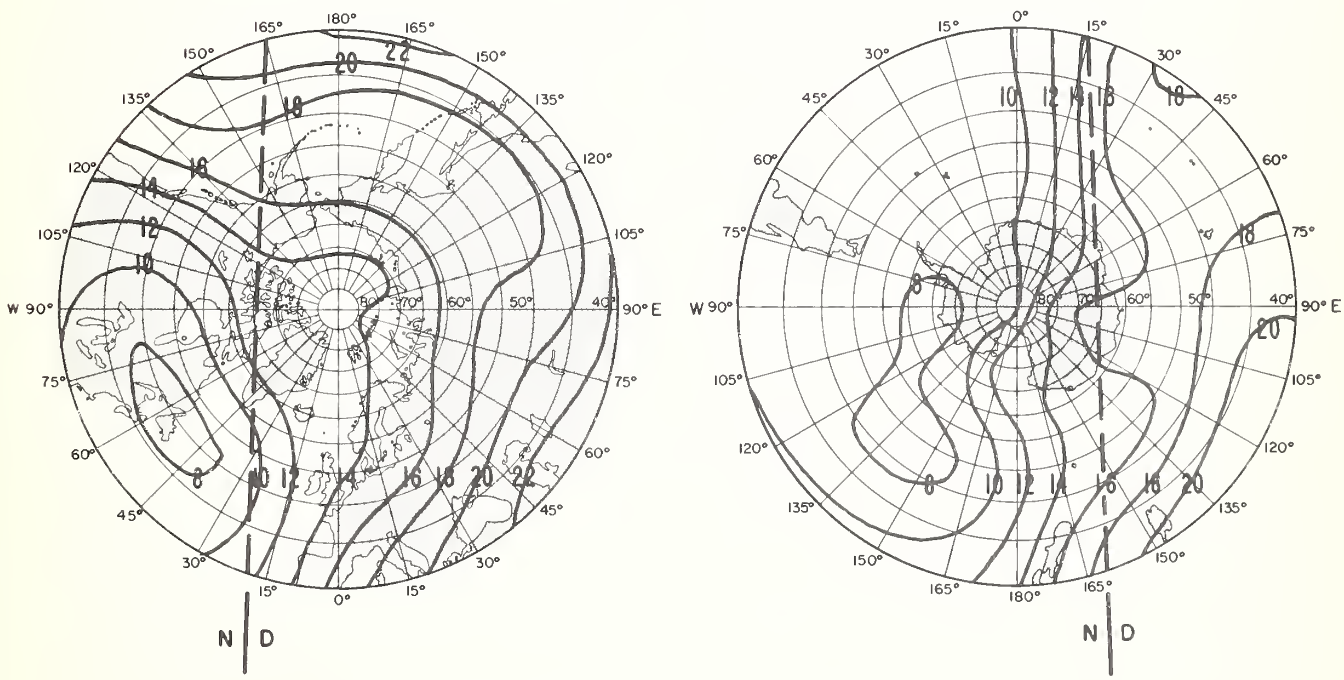

FIG. 16 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 08

NORTH POLAR AREA SOUTH POLAR AREA

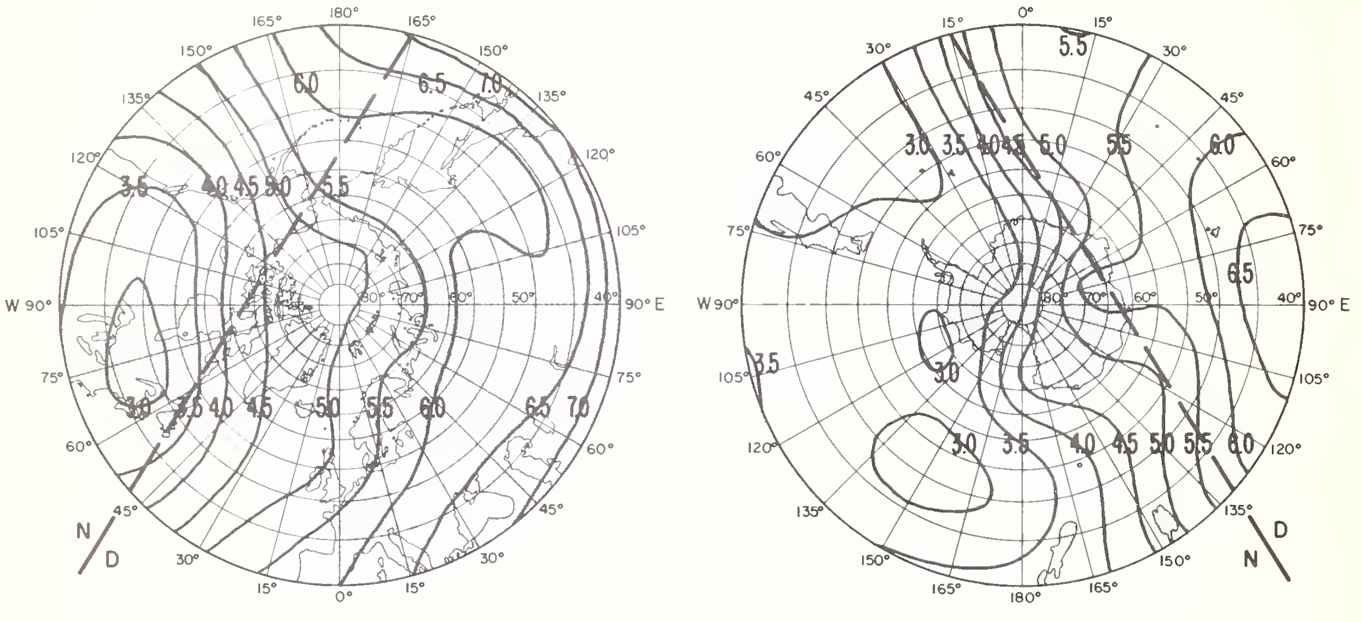

FIG. 17A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

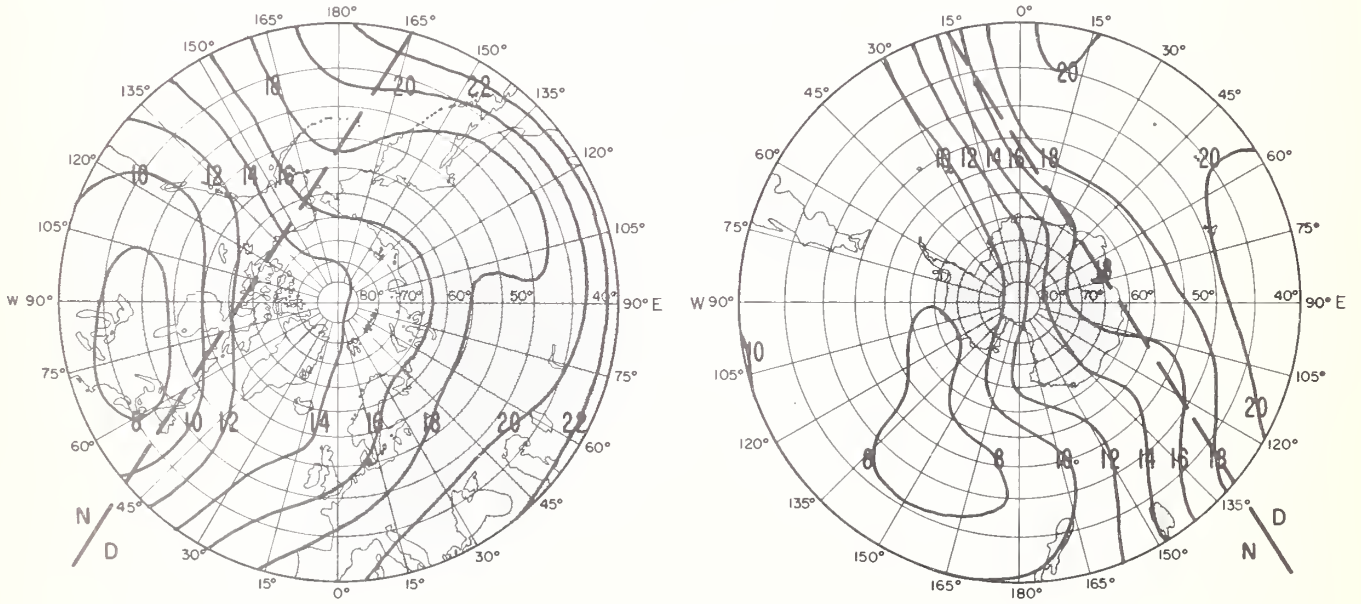

FIG. 17B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 10

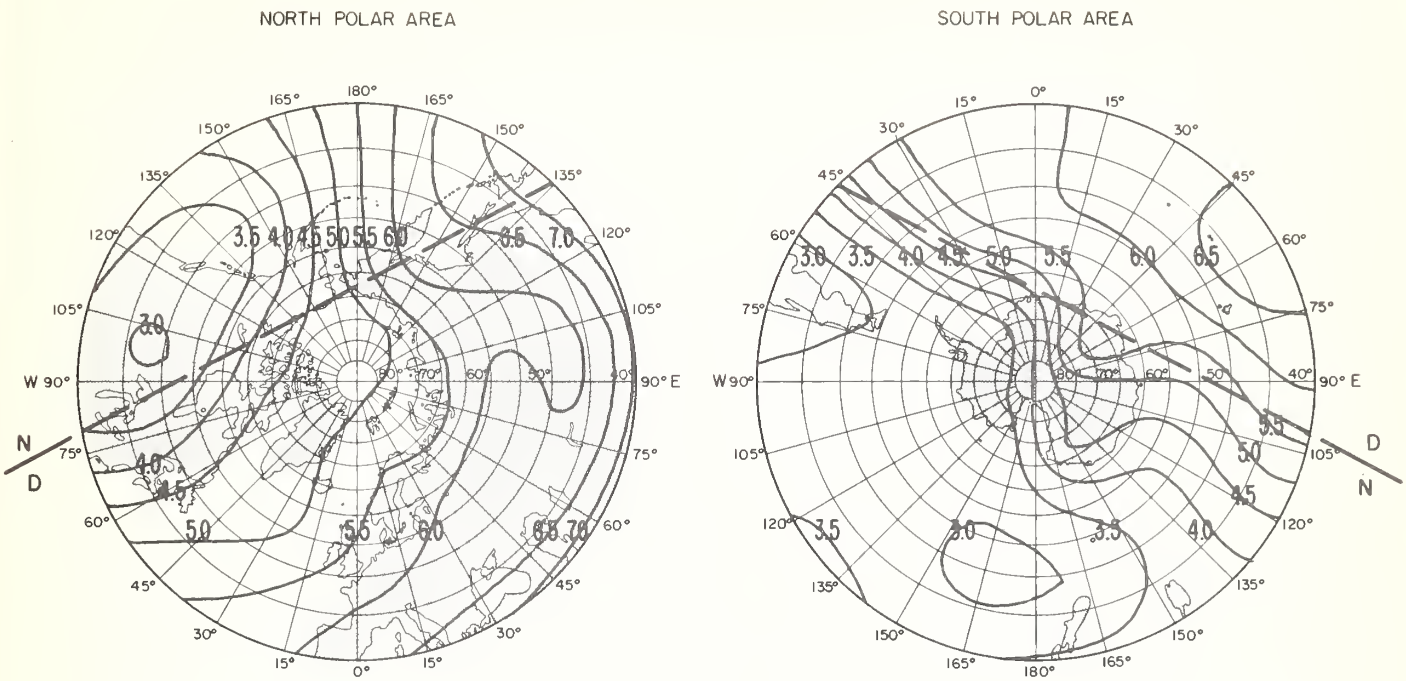

FIG. 18A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

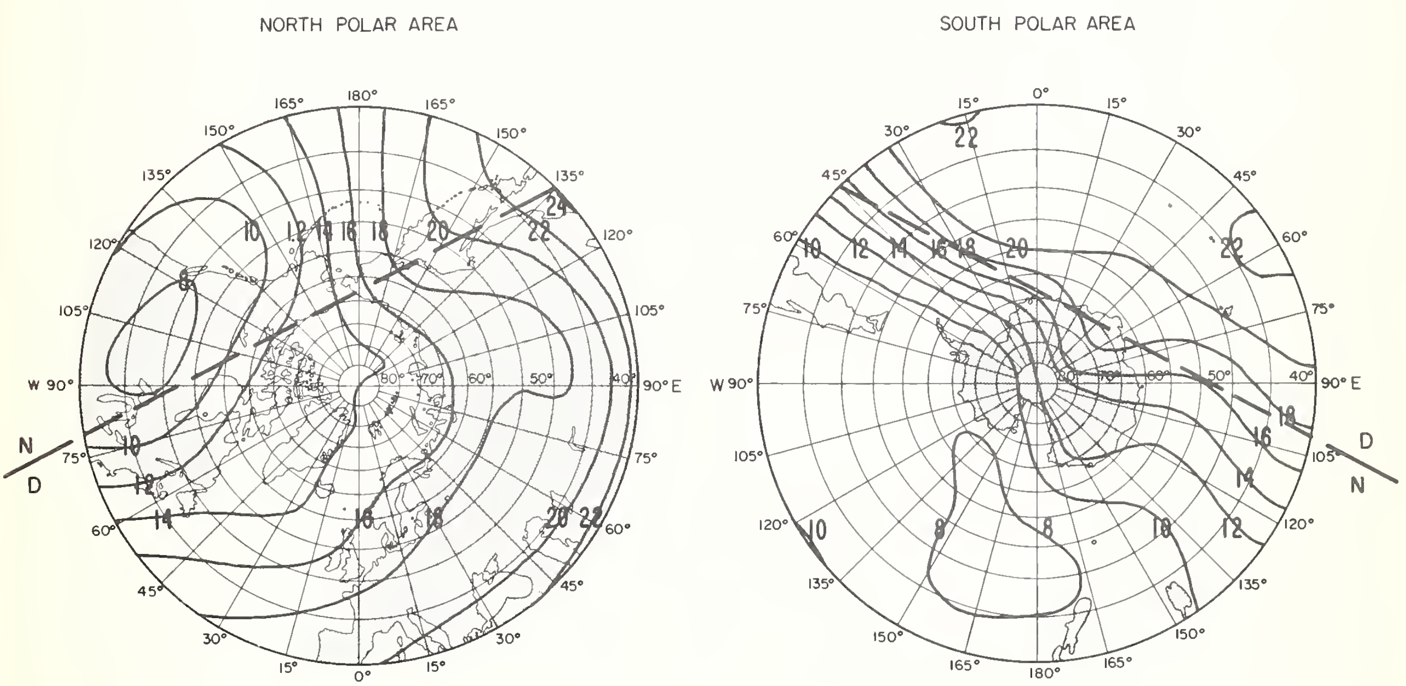

FIG. 18B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 12

NORTH POLAR AREA

SOUTH POLAR AREA

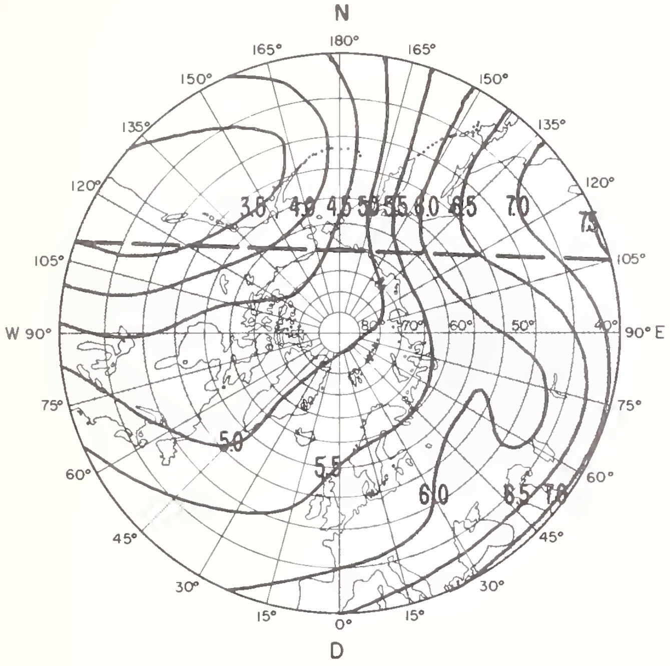

FIG. 19 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

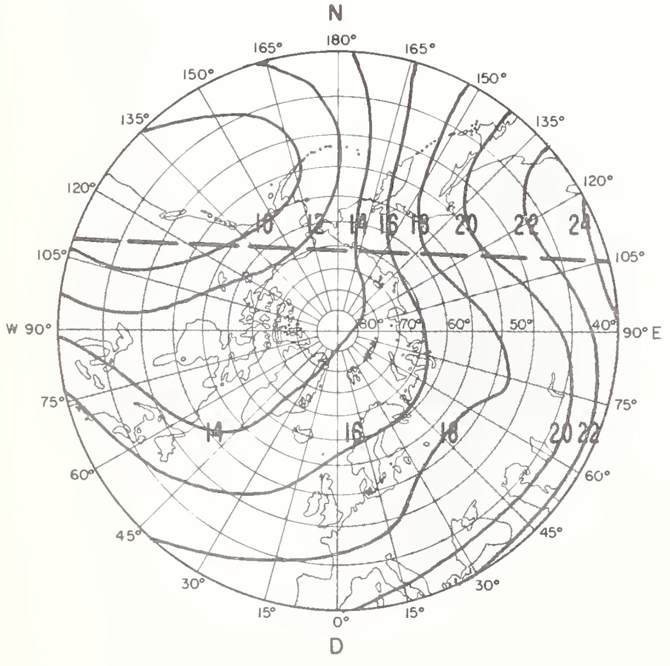

FIG. 19 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

NORTH POLAR AREA   SOUTH POLAR AREA

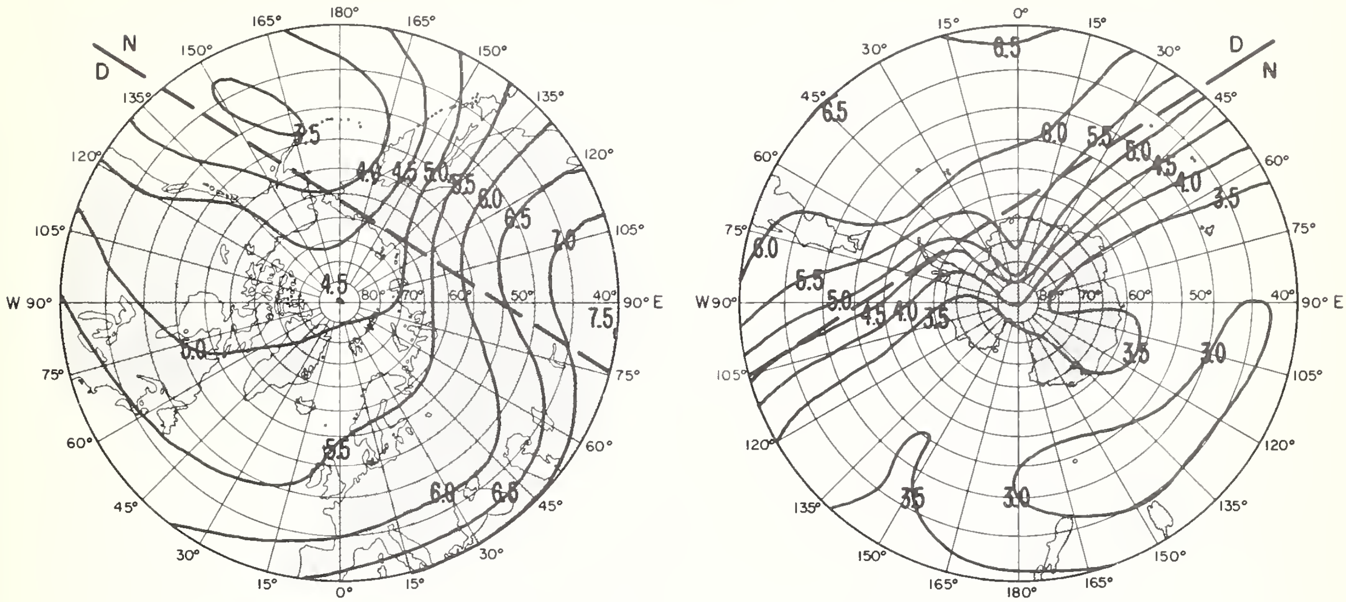

FIG. 20A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA   SOUTH POLAR AREA

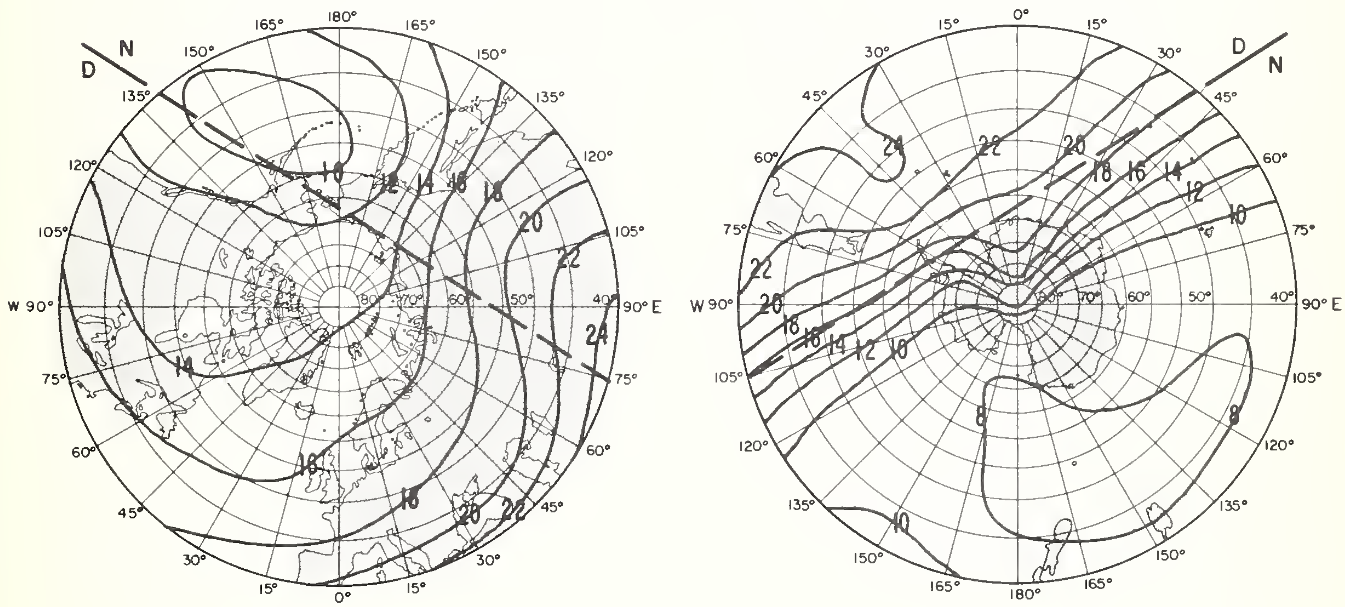

FIG. 20B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 16

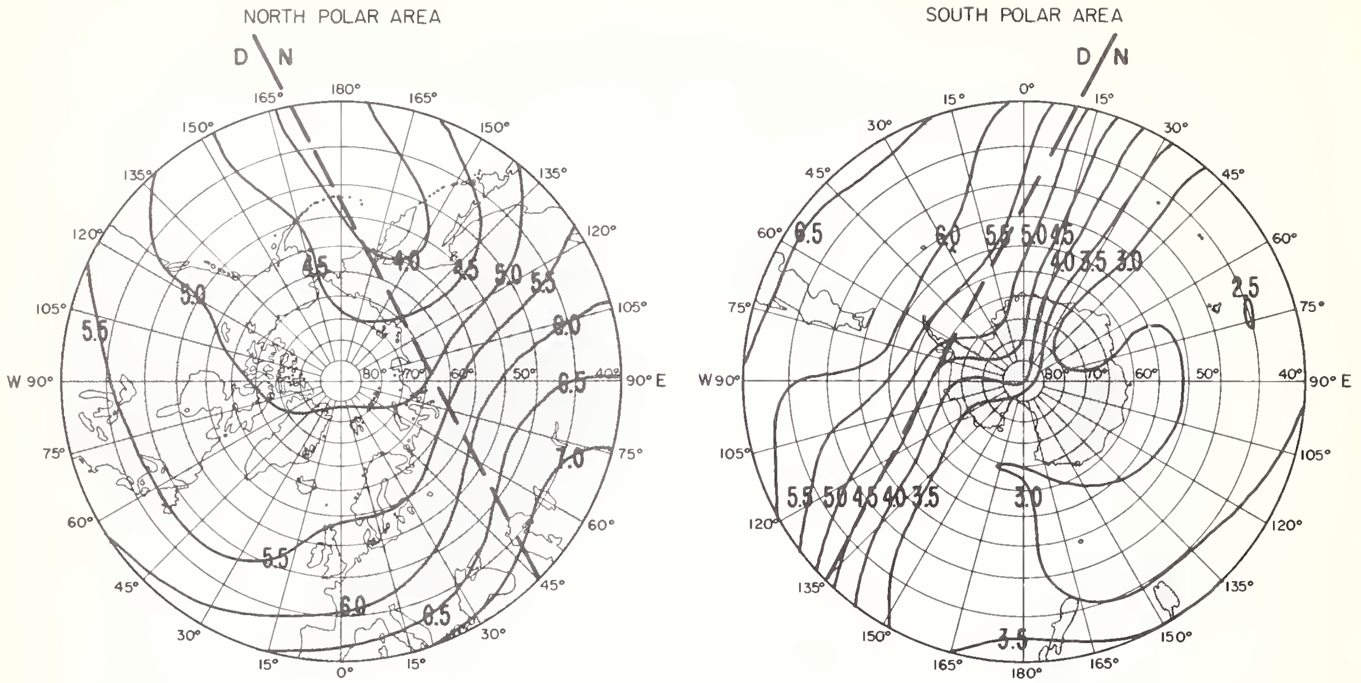

FIG. 21 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

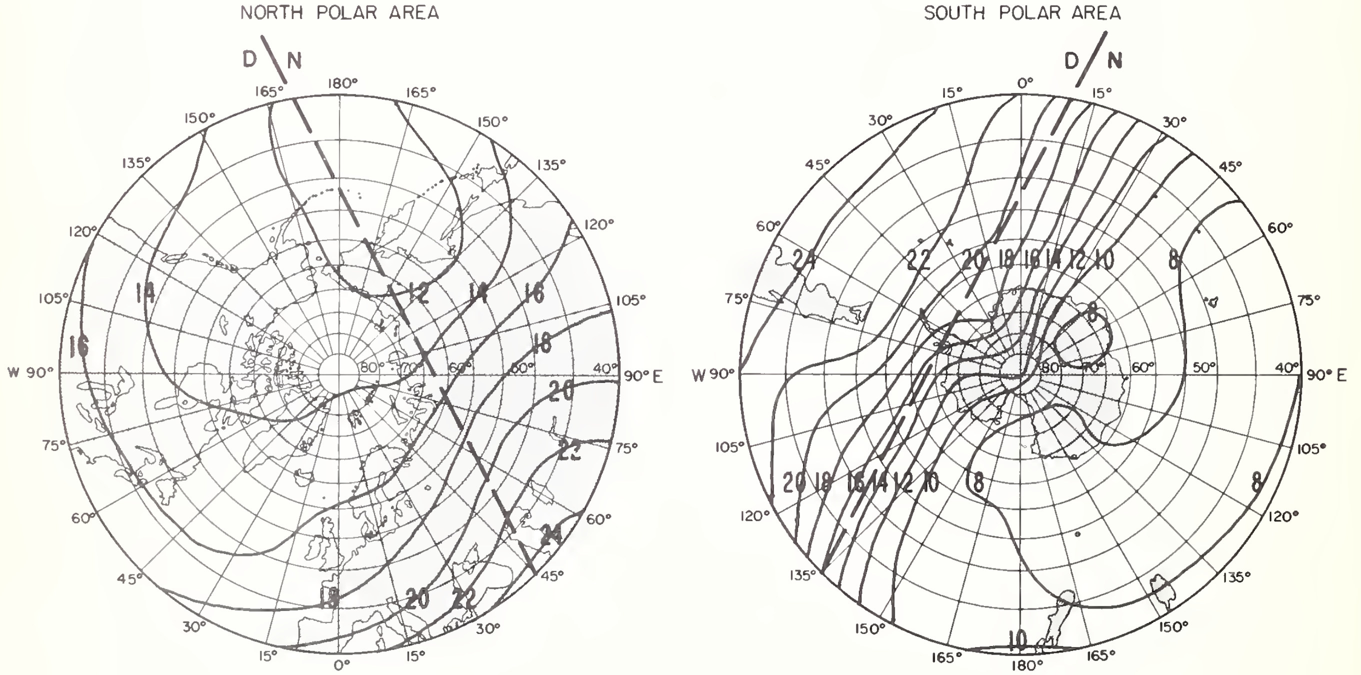

FIG. 21 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

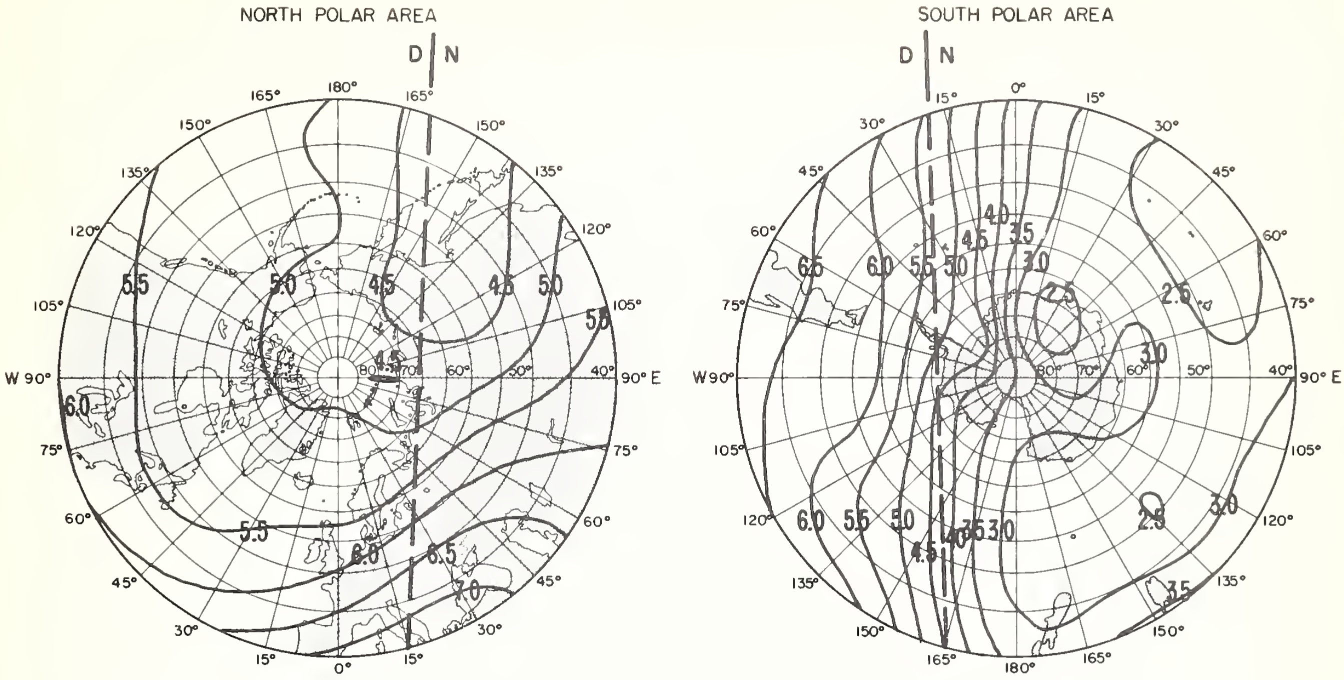

FIG.22 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

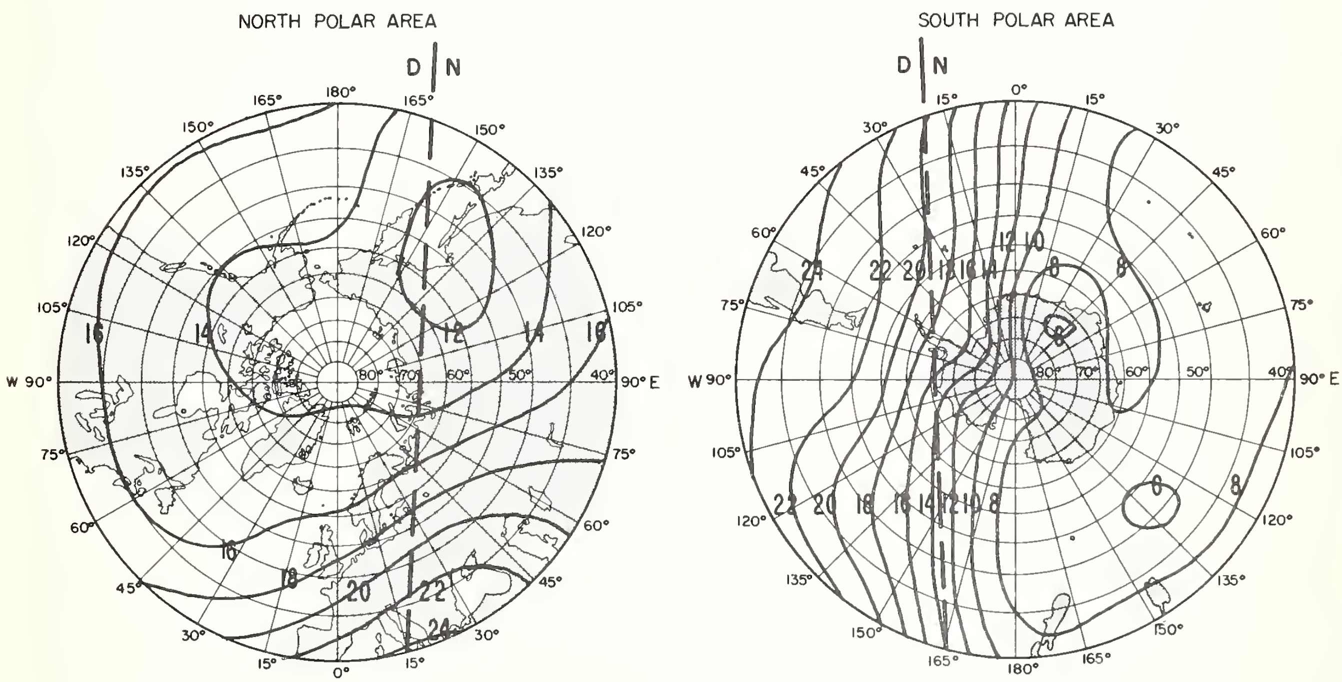

FIG.22 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

MAY 1965 UT = 20

NORTH POLAR AREA

SOUTH POLAR AREA

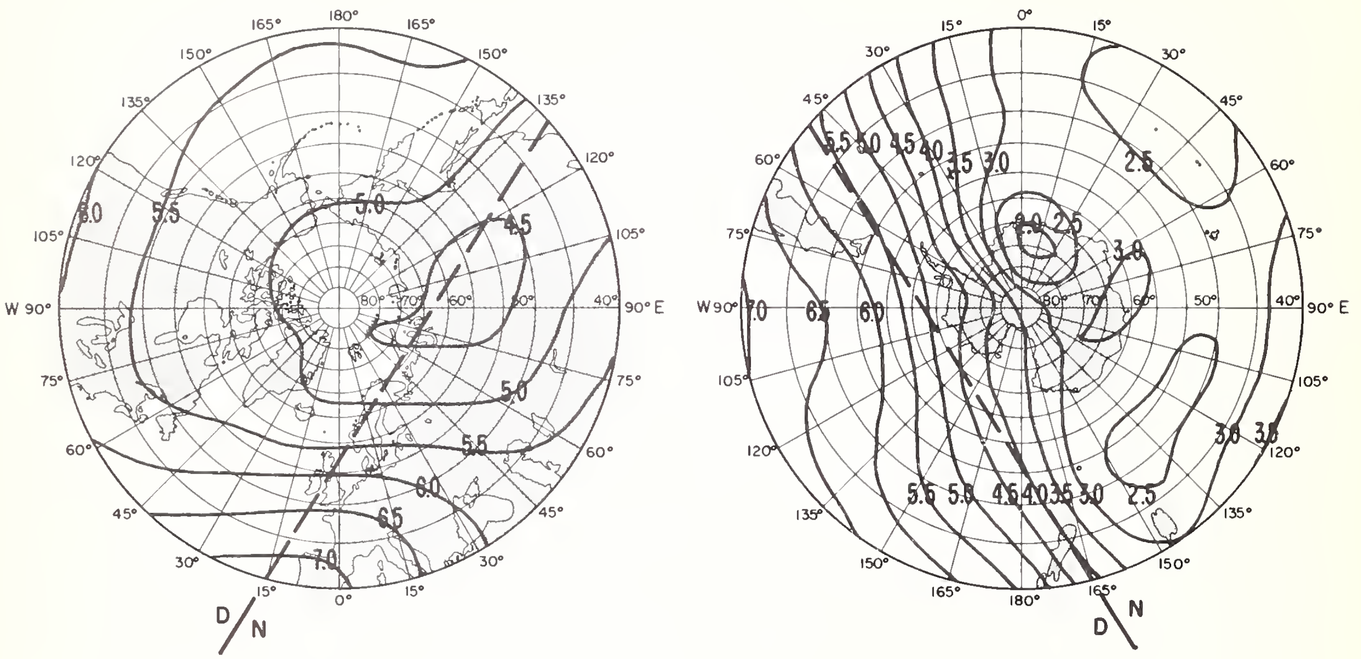

FIG. 23A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

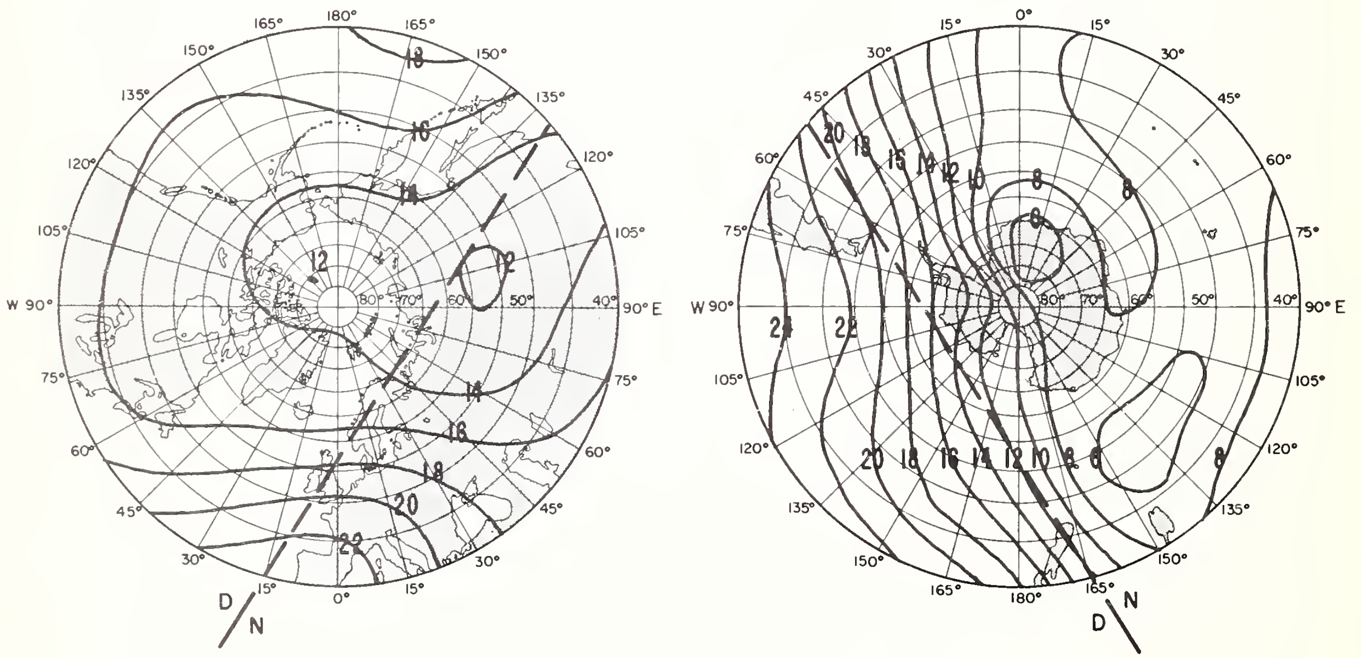

FIG. 23 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

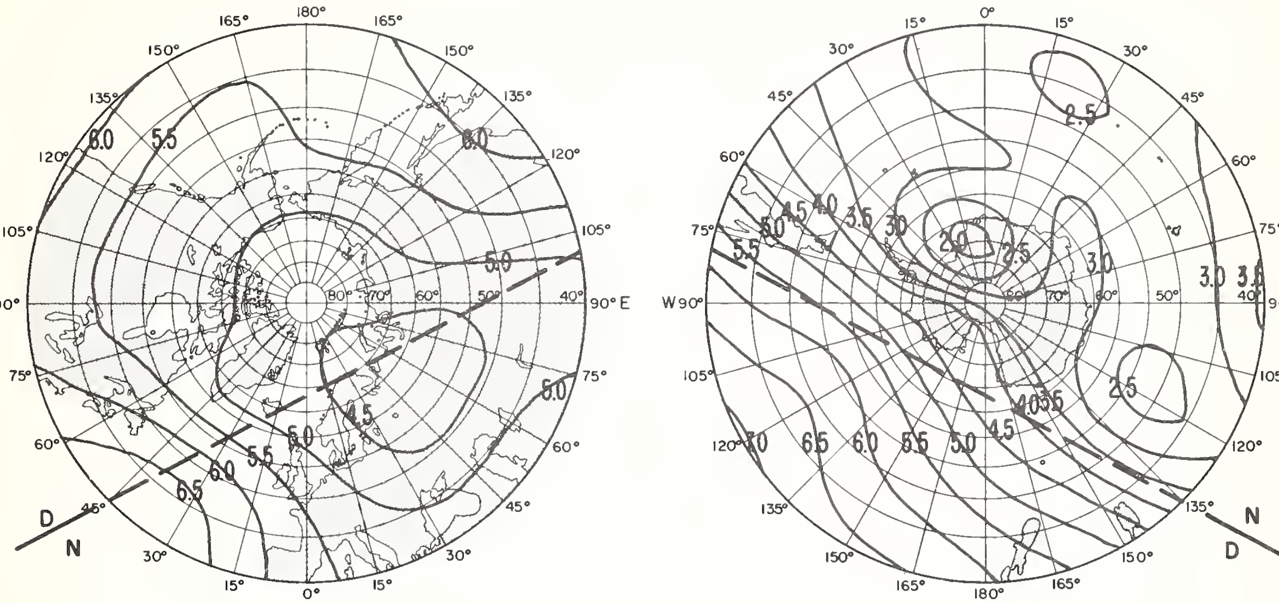

FIG. 24 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

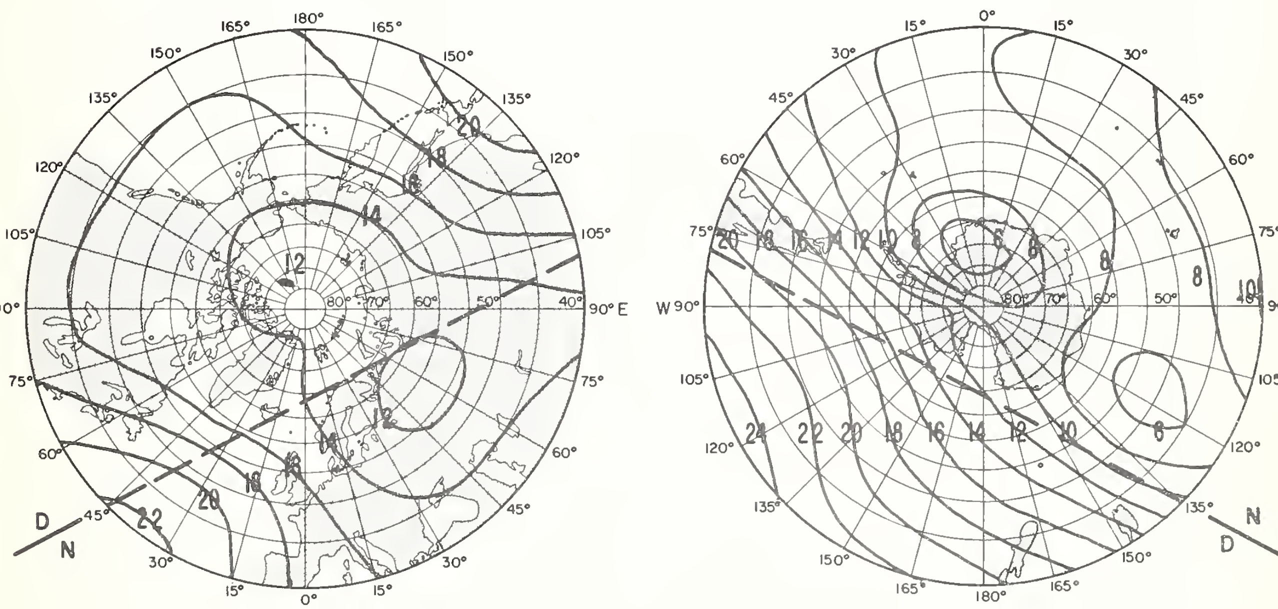

FIG. 24 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

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NG: None.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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